

COMMERCIAL FISHERIES *Review*

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DIV OF FISHERIES



COVER: Fishermen in the racks catching one-pole yellowfin tuna from a surface school. In the central Pacific, such schools of small fish are found near islands.

COMMERCIAL FISHERIES

Review

A comprehensive view of United States and foreign fishing industries--including catch, processing, marketing, research, and legislation--prepared by the Bureau of Commercial Fisheries.



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The grouper in the basket on the head of a woman is being carried to a market in India. It is the woman's total inventory for that day.
(Photo: FAO)

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U. S. FISHERIES: THE 1966 RECORD

U. S. fishermen caught 4,341 million pounds of fishery products in 1966 that sold for \$454 million--the highest dollar value in the industry's history. The catch was worth nearly \$8 million more than 1965's and was 20 percent above the previous 10-year average. Volume was 435 million pounds--9 percent less than 1965's and the smallest catch since 1953. (Record catch: 5,345 million pounds in 1962.)

The lower volume reflects the serious decline in menhaden landings. The catch dropped from 1.7 billion pounds in 1965 to only 1.3 billion pounds in 1966--a decrease of 416 million pounds or 24 percent. In 1965, menhaden were 36 percent of the total U. S. catch; in 1966, only 30 percent. Other important species landed in less volume in 1966 were tuna, jack mackerel, Pacific and Atlantic sea herring, yellowtail flounders, shrimp; and, to a lesser extent, Pacific mackerel, mullet, scup, sea bass, whiting, blue crabs, oysters, and sea scallops.



Fig. 1 - "Clean" catch consisting predominantly of pink shrimp.

On the brighter side, there was a record catch of king crabs and significantly greater catches of Pacific salmon, the best since 1949.

Increased landings of alewives, anchovies, and Dungeness crabs helped to offset the total decline.

The high average price per pound of the 1966 landings, despite the smaller catch, resulted from a smaller proportion of low-price industrial species and significantly higher prices paid to fishermen for food fish. Fishermen received a record average of 10.5 cents per pound, compared with 9.3 cents in 1965. Smaller volumes in 1966 of tuna, flounders, Atlantic sea herring, Atlantic ocean perch, scup, whiting, northern lobsters, and shrimp gave fishermen more money than larger landings of these same species in 1965.

Processing Industry Had Good Year

The billion-dollar U. S. fishery processing industry gained substantially and most segments enjoyed a profitable year. There was a record pack of tuna, an excellent pack of salmon, and increases in packs of Maine sardines, clam products, alewives, and tunalike fish.

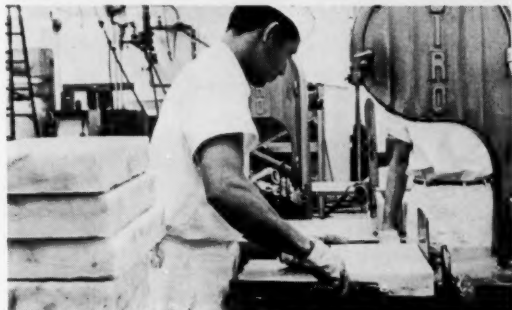


Fig. 2 - Production of breaded fish portions at Blue Water Seafoods plant. A series of cuts with high-speed saws turns blocks into uniform portions desired.

Canned fishery products were worth a record \$551 million. The remarkable fish stick and portion industry established volume and value records--production was 228 million pounds worth nearly \$100 million. Processors of breaded shrimp produced well over 100 million pounds to set a record worth nearly \$100 million. Producers of fresh and frozen fillets had a relatively good year. The volume of groundfish fillets, as expected, was less, but other types of fillets were produced in record volume. Firms preparing fish and shellfish specialty dinners and other packaged

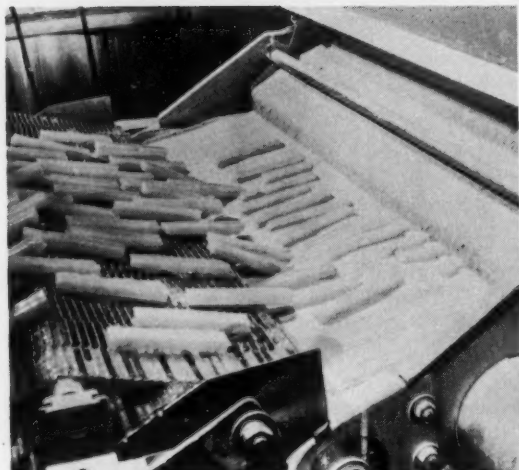


Fig. 3 - Fish sticks passing from batter to breading.

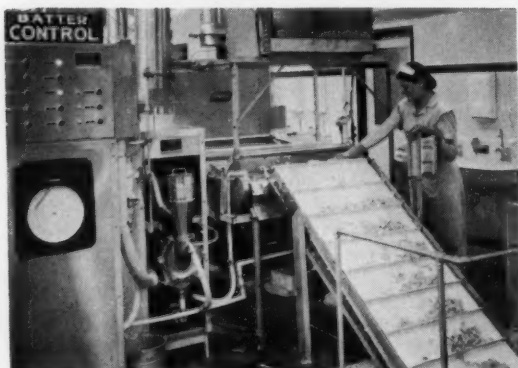


Fig. 4 - Frozen scallops about to be battered and breaded at Gorton.

fish and shellfish products also had a good year; all the records point to the spectacular growth of this industry in 1966.

The high dollar value paid to fishermen and the substantial gains of the processing industry were overshadowed by the marketing problems facing segments of the fishing industry at the end of 1966. Imports and domestic cold-storage holdings of fillets and blocks increased steadily in 1966. Despite BCF monthly statistical data forewarning the fishing industry, the accumulation of stocks continued to the year's end. Then, stocks of canned seafood were about 25 percent greater than at the end of 1965. The problem of heavy

holdings--canned and frozen--was compounded by the purchase of supplies at high prices.

RECORDS SET (Old Records in Parentheses)

CATCH

Total value: \$454 million (1965: \$445 million.)

Crabs, king: 158.9 million pounds (1965: 131.7 million).

The World Catch: 115.5 billion pounds (1965: 113.8 billion).

PROCESSED FISHERY PRODUCTS

Value of all fishery processed products: \$1.2 billion (1965: \$1.1 billion).

Tuna, canned: 19,953,567 cases (1965: 18,098,804).

Clams, canned, chowder and juice: 2.0 million cases (1965: 1.9 million).

Fish portions: 146.6 million pounds (1965: 140.5 million).

Breaded shrimp: 104 million pounds (1965: 98.1 million).

Fillets and steaks (other than groundfish): 92 million pounds (1965: 91.7 million).

IMPORTS

Import value: \$724 million (1965: \$601 million).

All fishery products: 8.1 billion pounds, live-weight (1964: 7.5 billion).

Edible fishery products: 2.9 billion pounds, live-weight (1965: 2.6 billion).

Industrial fishery products: 5.2 billion pounds, live-weight (1964: 5.2 billion).

Tuna, albacore, frozen: 180.2 million pounds (1965: 167.5 million).

Tuna, other than albacore, frozen: 208 million pounds (1964: 171.7 million).

IMPORTS (Contd.):

Tuna, loins and discs: 15.2 million pounds (1964: 14.9 million).

Tuna, canned: 61.6 million pounds (1961: 58.7 million).

Groundfish and ocean perch fillets, including blocks and slabs: 315.1 million pounds (1965: 295 million).

Fillets and steaks, other than groundfish: 92.7 million pounds (1965: 74.7 million).

Shrimp: 178.5 million pounds, import weight; 195 million pounds, heads-off basis (1965: 162.9 million, import weight; 179 million, heads-off basis).

Scallops, sea (meats): 16.7 million pounds (1965: 16.5 million).

Oysters, canned: 12 million pounds (1965: 8.6 million).

Sardines, canned: 57.6 million pounds (1962: 52.9 million).

Fish meal and scrap: 447,748 tons (1964: 439,143 tons).

SUPPLY (Domestic production plus imports)

All fishery products: 12.4 billion pounds, live-weight basis (1964: 12 billion).

Edible fishery products: 5.4 billion pounds, live-weight basis (1965: 5.2 billion).

Fillets, groundfish and ocean perch, including blocks and slabs: 390 million pounds (1965: 372.1 million).

Fillets, other than groundfish and ocean perch: 184.7 million pounds (1965: 166.4 million).

Tuna, canned: 455.8 million pounds (1965: 409.4 million).

Shrimp: 340.5 million pounds, heads-off basis (1965: 331.3 million, heads-off basis).

OTHER IMPORTANT FACTS

Louisiana led all states in volume: 664.1 million pounds, followed by Alaska: 588

OTHER IMPORTANT FACTS (Contd.):

million; California: 474.9 million; Massachusetts: 412.5 million; and Virginia: 418.4 million.

Alaska led all States in value: \$74 million, followed by California: \$53.3 million; Massachusetts: \$45 million; Texas: \$42.7 million; and Louisiana: \$39.8 million.

Shrimp was the most valuable item: \$95.8 million, 21 percent of total paid for all species and 43 percent above second most valuable item, Pacific salmon.

The Bureau of Customs reported 816 vessels obtained documents as fishing vessels--the largest number since 1949. Of this total, 551 vessels were built in 1966 for commercial fishing, and 68 were completed in 1965 but did not obtain documents until 1966. There were 197 older vessels converted to fishing in 1966.

The 404.8 million pound salmon catch was the largest since 1949; the pack of canned salmon (4.3 million cases) was the largest since 1952.

Landings of Atlantic cod, Pacific sardines, and oyster meats were the lowest on record. Atlantic sea herring landings were the smallest in 25 years; sea scallop meats, since 1946; Atlantic ocean perch, since 1939; and menhaden, since 1951.

For the 18th consecutive year, San Pedro led domestic fishing ports in catch value--\$33.6 million.

Foreign vessels, principally Russian and Japanese, intensified operations off U.S. coasts. While these fleets were taking more fish and shellfish on the high seas off the U.S., this nation's catch on high seas off foreign coasts declined from 464 million in 1960 to 369 million in 1966.

Peru was the world leader in landings in 1965 followed by Japan, China (Mainland), USSR and the U. S. In 1966, the USSR took 6 million metric tons of marine products and approached their fishery goal. Norway's catch increased

OTHER IMPORTANT FACTS (Contd.):

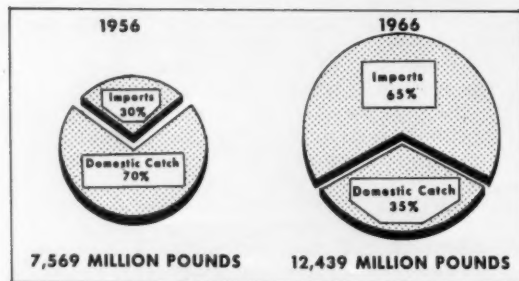
sharply in 1966 and may drop the U. S. to sixth place.

Japan led all nations in per-capita consumption of fishery products: 54.7 pounds of edible meat, followed by Sweden: 47 pounds; Norway: 44.5 pounds; China (Taiwan): 31.3 pounds; and the Philippines: 32.8 pounds. Annual per-capita consumption of fishery products in the U. S. was 10.6 pounds of edible meat.

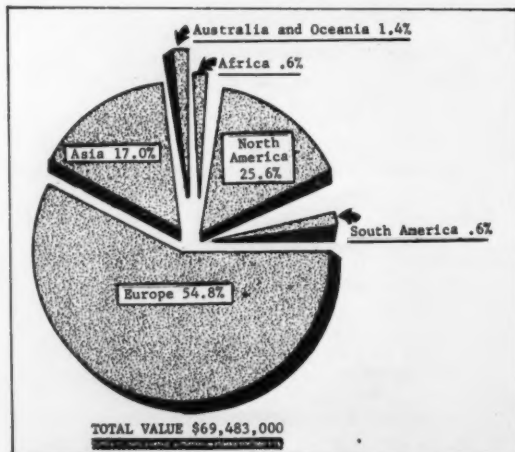
The number of fishery cooperatives in the U. S. was 102 in 1966. Members operated or owned 7,514 fishing craft.

During the 89th Congress, a number of legislative actions affecting commercial fisheries became public law. The most important measures extended the U. S. fishing limit from 3 to 12 miles (P. L. 89-658); authorized Department of the Interior to develop practicable means of producing fish protein concentrate (FPC) for human consumption (P. L. 89-701); created "sea-grant" colleges by amending 1966 Marine Resources and Development Act (P. L. 89-688); seek to control or eliminate jellyfish and other such pests (P. L. 89-720), protect and conserve North Pacific fur seals and sea otters on high seas (P. L. 89-702), and will set up a national oceanographic study to recommend coordination of numerous existing Federal programs (P. L. 89-454).

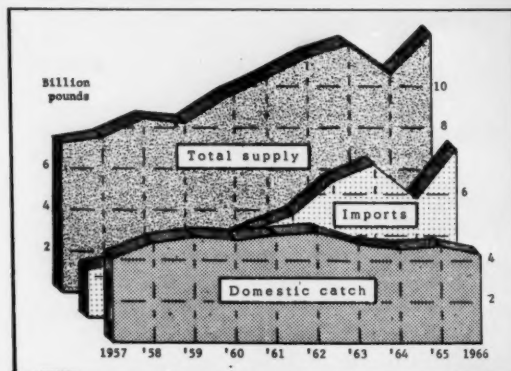
(Abstracted from "Fisheries of the United States, 1966," prepared by Branch of Fishery Statistics.)



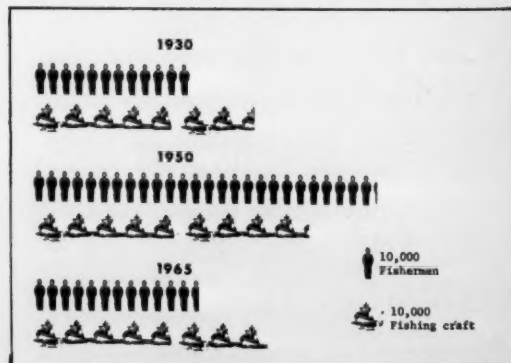
Domestic supply of fishery products increased 64 percent since 1956.



Value of U. S. exports to continent of destination, 1965.



U. S. supply of fishery products, 1957-66 (round weight basis).



Number of fishermen and fishing craft, 1930, 1950, and 1965.

U. S. OCEAN POLICY PROPOSED BY NATIONAL ACADEMY OF SCIENCES

The rapid growth of ocean science and ocean use during the past 8 years has produced enough knowledge and manpower to support a significantly larger national oceanographic program. During these years, the Federal budget for oceanography has grown from \$21 million in 1958 to \$221 million in 1967. So reports the National Academy of Sciences/National Research Council (NAS/NRC) in "Oceanography 1966 Achievements and Opportunities," a 183-page publication of its Committee on Oceanography.

The need for a national policy is underscored by the fact that the U.S. has not maintained a leading role in some uses of the ocean. And in 2 former major marine industries--fisheries and merchant marine--it has slipped.

The U.S. dropped from third to fifth place in total fish catch since 1958.

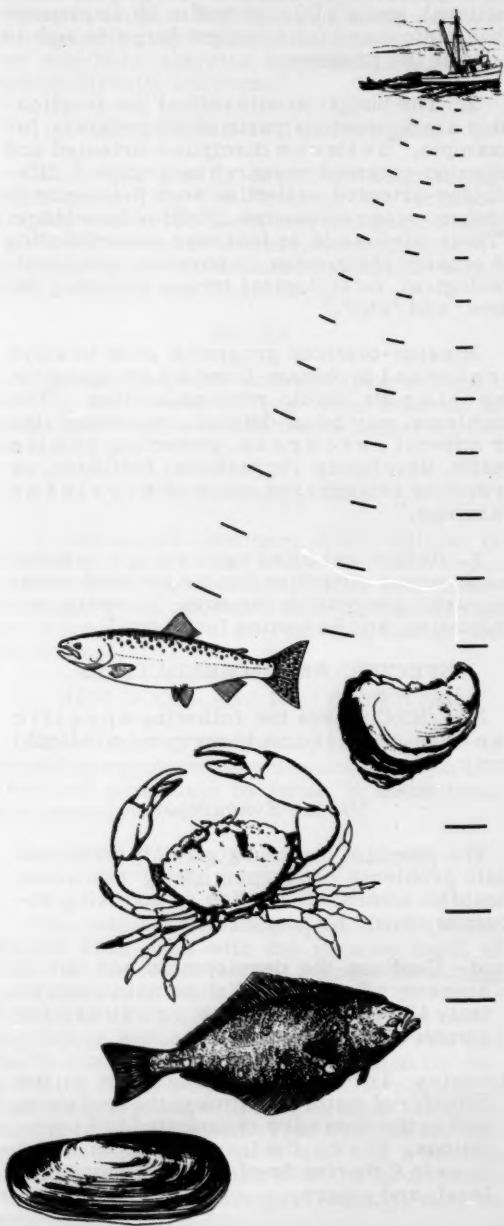
In the past 15 years, the world's merchant marines doubled in tonnage--while the U.S. merchant marine decreased.

NAS/NRC makes clear: "The purpose of the present report is to take stock of the current status of oceanography and to reassert or extend the recommendations made in our earlier report" ("Oceanography 1960 to 1970," summary chapter published in 1958, now out of print).

NAS/NRC'S 3 MAJOR RECOMMENDATIONS

NAS/NRC advises: "To reap the benefits from full and effective use of the ocean and its resources, it is necessary for use of the ocean to be concurrent with our gain of knowledge of the ocean. A national ocean policy should aim both toward increasing the extent of knowledge and toward developing the abilities that will enable us to go anywhere and do anything in the ocean that is, or may prove to be, beneficial.

"The national ocean policy should not only establish the national goals with respect to the science and use of the ocean, but it should also indicate the rate at which the goal is to be pursued. The national ocean program and budget should be based on this national ocean policy."



To carry out these purposes, NAS/NRC recommends that the U.S. should adopt: 1(a) a comprehensive national ocean policy to increase understanding and use of the ocean "at as rapid a rate as is consistent with other national goals"; (b) a program to implement that policy; and (c) a budget large enough to pay for the program.

2. The budget should reflect the relationship among various parts of the program; for example, "between discipline-oriented and mission-oriented research activities." Discipline-oriented activities seek primarily to advance ocean science as a field of knowledge. "Their purpose is to increase understanding of oceanic phenomena in physical, chemical, geological, or biological terms, including the 'how' and 'why'."

Mission-oriented programs seek to solve practical problems faced by an agency in meeting its public responsibilities. "The problems may be in defense, exploiting fish or mineral resources, protecting public health, developing recreational facilities, or providing seismic sea-wave or hurricane warnings."

3. Revise and strengthen the existing management structure for the national oceanographic program to improve "planning, coordinating, and budgeting functions."

SPECIFIC RECOMMENDATIONS

NAS/NRC makes the following specific recommendations to carry out a national ocean policy:

Marine Resources

The attention now being given to broad and basic problems concerning living resources should be continued. Studies on nonliving resources should be accelerated.

Food: Continue the development and use of processes for making fish protein concentrate (FPC) and other new products for human consumption.

Fisheries: Increase the research on the transfer of materials through the food chain and on the dynamics of exploited fish populations. Study the institutional obstructions to fisheries development--economic, legal, and others.

Minerals: Continue the development of techniques to extract minerals economically from the sea floor.

Studies on Marine Organisms: In the next 10 years, provide 4 new laboratories to study the survival requirements of young fish and shellfish. As a start, "one large-oceanarium-scale facility for fish-behavior studies" is needed.

Radioactive Wastes

The funds for basic research on the effects of artificial radioactivity on the marine environment should receive a 20% step increase.

Columbia River Studies: Continue the studies on the distribution of radioactive materials in the coastal marine environment near the Columbia River's mouth to follow changes in distribution that will result from decreases in the strength of the source.

Movement and Mixing Processes: Continue the studies of the movement and mixing of a contaminant into estuarine and coastal waters. Strongly increase the efforts in the open sea.

Routes, Rates, and Reservoirs: Studies are needed of the "natural rates of input of the elements to the sea, the distribution of elements in each reservoir, and the rates of transfer between various reservoirs, particularly for the trace elements."

Biological Transport of Elements: Strengthen studies of the distribution of stable trace elements in the biota (the fauna and flora of a region) and in the nonliving reservoirs to determine the importance of biological transport.

Effect of Radiation on Genetics: Continue the studies of radiation-produced damage to form and structure of marine organisms (morphological damage) and begin studies on genetic effects.

Biological Field Studies Utilizing Radioisotopes: Conduct studies of the mutual relations between organisms and their environment (ecological studies) in estuarine and coastal environments "wherever new low-level introduction of radioactive materials produces measurable amount of artificially introduced activity in the biota."

NEARSHORE WASTE DISPOSAL

There should be research and development studies to make possible multiple use of the nearshore zone for purposes that now often conflict--recreation, fisheries, aquaculture, waste disposal, production, kelp harvesting, and transportation.

Municipal and Industrial Wastes: Study estuarine and coastal waters on the effects of increased levels of nutrients--and changes in the balance of major and minor nutrients--on the rate of primary production, standing crop, the variations in species among the primary producers, and indirect changes higher up in the food chain.

Pesticides and Herbicides: Interior Department's Water Pollution Control Administration and Bureau of Commercial Fisheries and State agencies should support research on the effects of pesticides and herbicides on marine organisms nearshore and on the high seas.

OCEANWIDE SURVEYS

Conduct a program of deliberate and planned surveys (SEAMAP) of the open ocean, using systematic and standardized methods, which would lead to the production of charts and atlases encompassing the World Ocean. Continue the efforts to establish a worldwide navigation system with an accuracy of 0.1 nautical mile. A single system should cover the offshore areas of the U. S. up to at least 100 miles "with an uncertainty of about 100 ft. or less." The SEAMAP program needs additional shore facilities.

OCEAN ENGINEERING

"Ocean engineering data and information should be assembled and published systematically."

LONG-RANGE WEATHER FORECASTING

A global observation system should be established. "Further work should be done on numerical prediction models, extensive investigations should be carried out on basic problems of turbulent boundary-layer transport and small-scale interactions with large-scale motion." Special studies should be made of the coupling between circulations in the tropics and higher latitudes.

OCEANOGRAPHIC SHIPS

About 60 new ships are needed over the next decade. Continue to build ships of improved design to replace conversions and overaged ships. "All noncombatant surface ships used for research, development, or survey should be operated by the laboratory or agency directly concerned."

DEEP MANNED SUBMERSIBLES

"Provide a greatly improved deep-diving replacement" for the "Trieste" for oceanographic research. Build several more small two- or three-man submersibles. Shipboard-handling apparatus should be included in these construction programs.

BUOYS

Continue the work on identifying and correcting the causes of long-term failures of deep-water buoys so that they will last a year or more.

SHORE FACILITIES

An estimated minimum of \$36 million is needed for more new shore facilities from 1966 to 1971. They should provide laboratory space for an increased research program and more scientific personnel entering the marine sciences.

NEW TOOLS AND INSTRUMENTS

"Development of research instruments should be supported in connection with specific research programs by funds to institutions and researchers."

DATA HANDLING, PROCESSING, AND STORAGE

The national Oceanographic Data Center should keep pace with the growing input of data. More effort should go to developing procedures for the automation of data reduction aboard ship. Data from about 5,000 oceanographic stations should be selected and made available as basic information for describing the mean properties of deep water--and to experiment with a "live atlas" or other means of presentation. This computer-compiled oceanographic data will tell a user in minutes the precise and detailed information he wants, e.g., temperature, salinity, oxygen, etc.

EDUCATION AND MANPOWER

Increase the funds for faculty salaries, graduate training facilities, and fellowships and research assistantships to ensure the necessary growth of trained oceanographers. Encourage the development of university training programs in ocean engineering.

FEDERAL ORGANIZATION FOR OCEANOGRAPHY

The Navy: Funds of the Office of Naval Research to support basic oceanographic research should keep pace with the growth of the Navy's oceanographic budget.

Bureau of Commercial Fisheries (BCF): Should provide support through grants and contracts for research projects in fishery oceanography at universities and private research institutions. (See "Interior Awards 18 Oceanography Study Grants," page 24, of this issue.)

Environmental Science Services Administration (ESSA), Institute for Oceanography and Coast and Geodetic Survey: The ESSA budget should include support for grants and contracts for basic research related to its interest. ESSA should expand its cooperative programs with the academic community.

Department of State: Should help to facilitate research-ship operations throughout world through exchange of information and speeding the movement of persons, equipment, and supplies. There should be closer liaison between ship cruise-planners and State's scientific officers--and more such officers assigned to marine programs.

INTERNATIONAL COOPERATION

The U.S. should help other countries develop national oceanographic programs. There should be more emphasis on surveys of marine resources and on training programs and research projects related to greater use of proteins from the sea by developing nations.

Federal agencies should give long-term support to research and educational activities in the marine sciences that will be carried out cooperatively by U. S. institutions and developing centers of marine sciences throughout the world.

"A world oceanographic organization should be established within the United Nations to provide a single home for the various marine scientific and technological activities now lodged in several branches of the United Nations and its specialized agencies."

The 183-page NAS/NRC report costs \$5 and is available from: Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Ave. NW., Washington, D. C. 20418.

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UNITED STATES

U. S. Selects Northwest as Site for FPC Plant

The Federal Government's first pilot-scale demonstration plant to make fish protein concentrate will be located in the Pacific Northwest, Secretary of the Interior Stewart L. Udall has announced. The exact location will be announced after more study. Target date for completing the plant is spring 1968. BCF now is conducting preliminary engineering studies.

The plant will be designed to demonstrate how practicable it is to manufacture fish protein concentrate. It will aid private firms by providing a basis for the design and construction of larger commercial plants.

Funds totaling \$1,000,000 to build it--and \$700,000 to operate and maintain it and conduct research--are included in the President's 1968 budget. Appropriations to construct one plant and lease another were authorized in November 1966 and waited on approval of fish protein concentrate by the Food and Drug Administration.

President Johnson has urged the development of FPC to proceed "on an urgent basis."



New Lined Carton to Transport Fishery Products

A Boston (Mass.) firm is manufacturing new types of containers for efficient and economical transport of fish and shellfish by land, sea or air. The containers consist of a foam plastic liner in an outer corrugated carton. They are claimed to have a high strength-to-weight ratio, excellent thermal insulation, outstanding shock absorbency, good moisture retention, and chemical inertness; they reduce packaging costs, eliminate damage, and are light for shipping purposes.

The foam plastic liner boxes are made in 3 sizes: (1) for shipping fresh fish fillets, about 20 x 12 x 4 inches; (2) for shipping lobsters, shellfish, and bulk packs of fish fillets,

about 21 x 13 x 14 inches; and (3) a jumbo box designed to carry 60 pounds of live lobsters, which nests for storage, measures about 21 x 16 x 14 inches.

Special Container for Lobsters

To keep lobsters in perfect condition, the firm recommends packing them in jumbo containers with fresh seaweed and 1 or 2 of their firm's reusable ice packs. The packs consist of 1½ or 3 pounds of frozen chemical gel in a tough polythene bag; the refrigerating properties are said to equal 5 times their weight of ice, last longer, and also are cleaner and more convenient.

The ice packs can be used many times. The manufacturers say the containers are being used increasingly by shippers in Boston, Washington, California, and Alaska to pack live lobsters for Midwestern cities and Europe. ("Fishing News International," Jan. 1967.)



1966 Lake Michigan Alewife Landings Are Double 1965's

The 1966 Lake Michigan alewife production of 29 million pounds doubled the 1965 landings and is expected to double again this year. The primary reasons are the new Menominee meal plant, which has contracted to buy the production of several new Lake Michigan trawlers, and more pound-net fishing operations in the Green Bay (Wisc.) area.

Pet food fish-freezer capacity also is being increased over fivefold in southeast Lake Michigan. A Chicago pet-food processor, who uses 60 tons of fish a day, plans to bring a Gulf of Mexico trawler for test fishing operations.

BCF's Ann Arbor exploratory fishing staff is actively aiding this burgeoning industry.



Oceanography

SCIENTISTS DETECT CERTAIN GRAY WHALE SOUNDS FOR FIRST TIME

Marine scientists now have "conclusive evidence" that gray whales emit unique sounds other than those from locomotion and feeding, reports the U. S. Navy Electronics Laboratory (NEL), San Diego, Calif. William C. Cummings, an oceanographer in the laboratory's Listening Division, discloses that "week-long, around-the-clock studies off the San Diego coast in 1966 and 1967 show that gray whales produce distinctive, low frequency, moan-like sounds." These sounds--50 to 200 cycles a second and about $1\frac{1}{2}$ seconds long--are in the frequency range of bass clef on the piano. Previously, many researchers believed gray whales did not make the sounds many other whales do.

Cummings also reported that gray whales continue their migration to Mexican waters during nighttime.

Some scientists had maintained that gray whales did not migrate at night, or did so under full moonlight when they could see.

How Study Was Conducted

The NEL research yawl "Saluda" was moored in the ocean as a platform for both visual and acoustic observations. Cummings, who was scientist in charge, explained:

"We put hydrophones (underwater microphones) on the ocean bottom. One hydrophone was located to the north of the ship and one to the south. They were separated by 1,000 feet. The distance between the hydrophones was carefully measured so that when signals were received on the two hydrophones we could use the arrival time differences and the signal strength in calculating the position of the sound source."

To aid the study, a small boat sonar mechanism designed to track whales and corroborate visual observations was used.

"Last year, the moan-like sounds were recorded in limited numbers, but were not identified for certain as sounds generated from the gray whale. This year's findings enabled us to positively link this distinctive sound to the gray whale. Another sound recorded from gray whales was from the blow as the whales surfaced, exhaled and inhaled," Cummings said.

Moan-like sounds were not always produced as the whales went by the hydrophones, and the blow sounds were recorded only when they were very close to the hydrophone.

Cummings reported: "Earlier observations have resulted in conflicting data on gray whale sounds. Some investigators were not successful in their attempt to record sounds from gray whales. Others have reported hearing high frequency clicks of the type often associated with echo-ranging. We could not confirm the presence of clicks even though observations were made during darkness and fog when the whale would be likely to employ echo-ranging to supplement its vision."

The gray whale, a baleen whale, sieves plankton from the water. Some baleen whales produce low frequency moans and groans, but never has any echo-ranging, high frequency click been recorded from a baleen type whale.

Nocturnal Migration

At night the whales migrate, Cummings said. "They did so even when there was no moon shining. They also migrated at night when the area was covered by dense fog and human visibility was limited to 125 feet."

The night migration often is revealed by a spectacular display of bio-luminescence, which presumably comes from the luminescent plankton in the water; these light up when disturbed by the whale's swimming movements. Cummings flew over migrating whales at night and could see luminescent trails behind them. "On two occasions I could see the whale from the air in a cigar-shaped area of brightened light," he said. "Consequently we are quite sure these trails were produced by whales."

What possible use could the gray whale make of his low-frequency sound? Cummings suggests that the most likely use is for communication with other whales. It is possible that they also may obtain gross information on the location of large objects--land masses, other whales, ocean bottom, or nearby ships.

"Many toothed cetaceans use high frequency clicks for echo-ranging to obtain information about the environment which they cannot see, and it's possible that grays use a low frequency sound to do the same thing--but on a much more limited scale. Of course, the behavioral significance of these moans is conjecture at this point."

Studies Conducted During Southerly Migration

The studies were conducted in mid-January 1966 and 1967, during the southerly migration of gray whales. Two hundred gray whales were seen during the week-long observations each year.

Cummings said: "One day, at 2 a.m., we were treated to a spectacular display of luminescence caused by a gray whale which came nearly completely out of the water except for its flukes. When the whale splashed down, luminescent spray was sent a good 25 to 30 feet into the air. The whale could be seen surrounded by light."

Study of the gray whale resulted from the Navy's interest in passive sonar and the identification of possible strategic targets.

U. S. WEATHER BUREAU TO EXPAND MARINE FORECASTS

The U. S. Weather Bureau this year will expand its network of radio stations broadcasting instant marine weather forecasts by adding 15 on the east, west, and Gulf coasts to the 4 now operating. These forecasts are issued on Very High Frequency (VHF) FM broadcasts at 162.55 megacycles. This is not the commercial FM band, but special receivers costing \$25 to \$90 can be purchased. Owners of marine radiotelephones may need only an appropriate crystal in an unused channel to receive continuous-forecast transmission.

The 162.55 megacycle frequency will be standard throughout the U. S. for all Weather Bureau instant weather forecasts. Mariners can use the same receiver in any broadcast territory to pick up the transmission within 40 miles of any network stations.

Atlantic to Pacific Network

The 15 cities scheduled to offer service during 1967 (installation dates will vary) are: Atlantic City, N. J., Boston, Mass., Charleston, S. C., Corpus Christi and Galveston, Tex., Hartford, Ct. (with antenna on Southern Conn. coast), New Orleans and Lake Charles, La., Los Angeles and San Francisco, Calif., Jacksonville, Miami, and Tampa, Fla., Norfolk,

Va., and Washington, D. C. These cities will be in addition to the four at Chicago, Honolulu, Kansas City, Mo., and New York City, where the forecasts have won favorable public reaction.

The broadcasts, strongly oriented toward marine needs, are also designed to provide useful information to the general public. They will consist of overall weather summary, radar weather summary, observations of wind, weather visibility, and sea conditions from reporting stations, and a detailed local and area forecast. One primary purpose will be to provide immediate warnings of squalls, thunderstorms, tornadoes, and hurricanes. Broadcasts will be updated immediately to reflect significant storm activities.

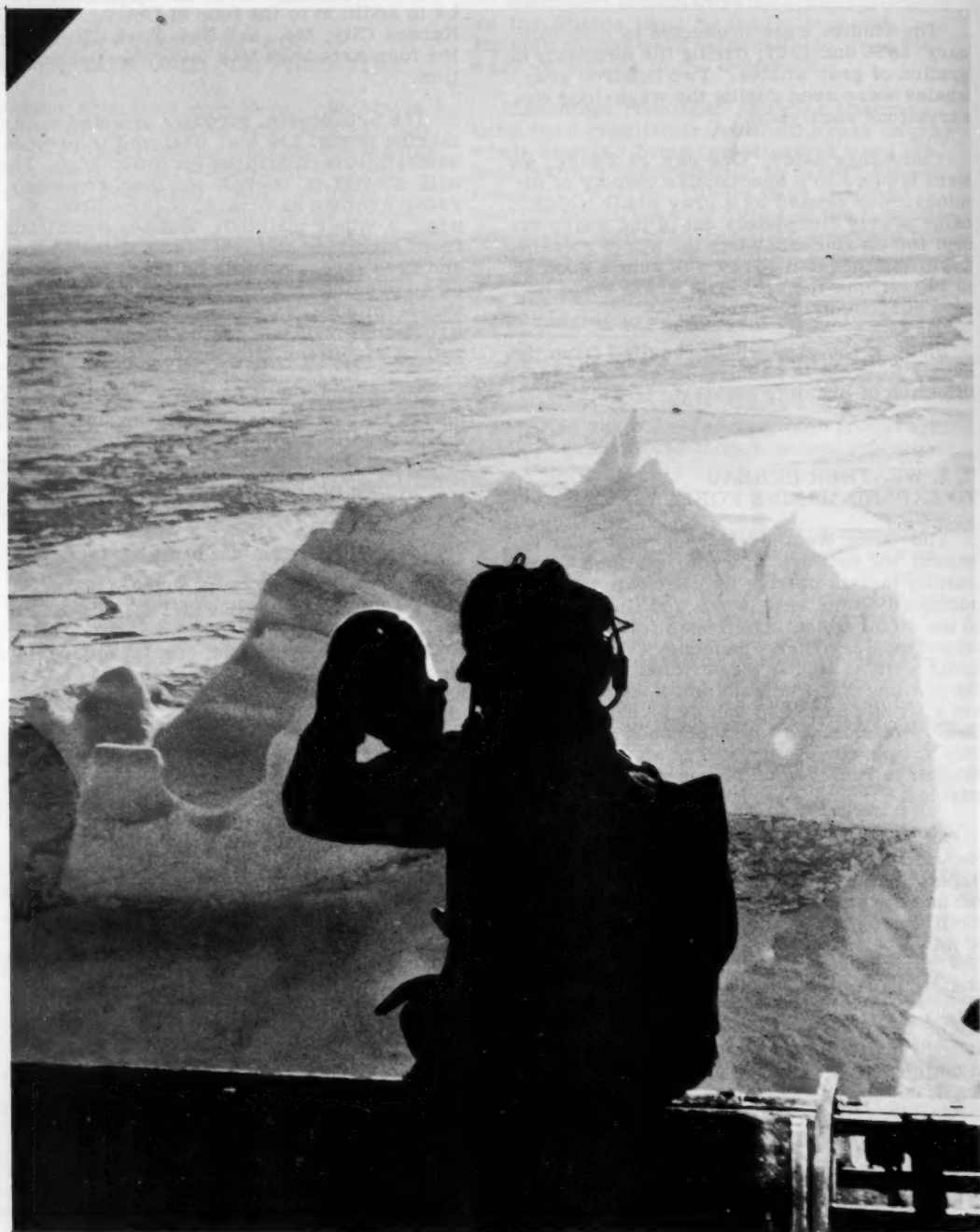
The forecast will be tape-recorded, then played automatically and continuously. Normally it will be updated every 2 or 3 hours, and more frequently during rapidly changing conditions. (U. S. Department of Commerce, ESSA, Feb. 23, 1967.)

COAST GUARD'S INTERNATIONAL ICE PATROL HAS PREVENTED DISASTER

On April 14, 1912, the great, "unsinkable" liner "Titanic," destroyed herself on an iceberg off Newfoundland. It was her maiden voyage; 1,500 persons died.

There were many memorials--but the most lasting is the operation of the International Ice Patrol, under U. S. Coast Guard direction, now in its 53rd year. The Patrol is the world's most successful international effort to promote safety at sea. The Coast Guard reports that not one life has been lost in North Atlantic shipping lanes due to iceberg collisions since the Patrol's inception in 1914.

Every year since then, except for intervals in the World Wars, Coast Guard ships and aircraft have waged their annual war against the iceberg menace. Now, and throughout the ice season, early March-June or July, ice reconnaissance is carried out by aircraft deployed from their permanent base at Elizabeth City, N. C., to Argentia, Newfoundland. And standing by is the cutter "Acushnet" out of Portland, Maine.



A Coast Guardsman in rear cargo doorway of Ice Patrol plane aims calcium chloride-rhodamine "B" dye bomb at iceberg. The iceberg--in Davis Strait off Baffin Island--is imbedded with bright vermilion stain for future identification and aerial tracking. (Photo: U. S. Coast Guard)



Fig. 1 - Ice Patrol Plane Hedge-Hopping Icebergs--Since World War II, aircraft, not ships, have performed the major part of the Ice Patrol's work of hunting and tracking icebergs. In this head-on view of an HC-130-B "Hercules" Ice Patrol plane, the plane is hedge-hopping a row of icebergs off the Labrador Coast. The berg in foreground was selected for tracking of movements with the currents by marking it with aerially dropped calcium chloride-rhodamine "B" (brilliant red) dye bomb.

(Photo: U. S. Coast Guard)

Patrol Is Increasingly Scientific

The Patrol has assumed an increasingly scientific character. Today, it uses the techniques of modern science to do its job. It watches for floating bergs--and also gathers information on the phenomena of northern waters. It is a basic part of the Coast Guard's expanding, century-old, oceanographic program.

During the 1967 iceberg hunt, oceanographic scientists will attempt to link iceberg detection techniques with weather-satellite photo reconnaissance. The Coast Guard will install a transceiver at Patrol Headquarters in New York, which may be able to receive directly weather-satellite photos of ocean areas covered by the Patrol. This information will be combined with data from planes equipped with radiometric iceberg detectors to provide sharper definition and location of the areas under surveillance. Eventually, the Coast Guard plans to take part in a satellite system that will provide higher resolution for earth phenomena.

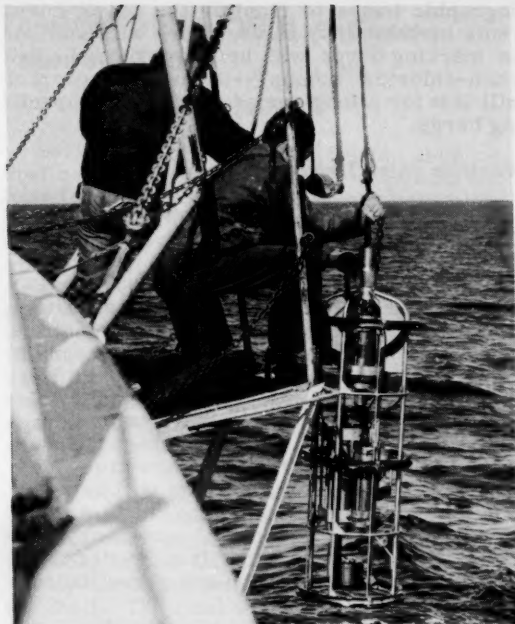


Fig. 2 - Ocean Science Important to Ice Patrol Vigilance--The constant study of the ocean currents, which greatly influence iceberg movements, is important to the Ice Patrol's predictions and tracking plots for iceberg seasons. Here, a Salinity Temperature Depth Sensor system is used on the Coast Guard oceanographic vessel "Evergreen" on a mission to determine if the source of the Labrador Current is in the Hudson Strait. The Sensor systems instantaneously record readings of salinity, temperature, and depths down to 1,500 meters.

(Photo: U. S. Coast Guard)

Instrument Can Isolate Berg

The radiometric iceberg detector, developed by Coast Guard and Sperry engineers, "is based on the principle that all matter emits electromagnetic impulses of varying intensity." The detector measures each "signature" and makes it possible to determine whether an object is ice or some other floating object.

Coast Guard oceanographers will continue to study the Gulf Stream and Labrador Currents to understand better these forces that strongly influence the drift of huge ice islands, sometimes as large as office buildings. Also, they will continue to study North Atlantic waters through sampling, salinity measurements, and analysis of marine organisms. As an added surveillance device, the Coast Guard will continue to experiment with large ocea-

nographic buoys to monitor the ocean currents in which they move. Work will continue on marking bergs with brightly colored calcium-chloride "bombs"--to develop a type that will last for a long period and facilitate tracking bergs.

Weather Ships Used Too

The Coast Guard also uses weather ships. During their 3-week patrols in 10-mile-square sectors of the North Atlantic, the cutters transmit weather and other meteorological data to transoceanic ships and planes. They also conduct marine studies. They assist the Coast Guard in its growing effort to describe the water mass exchange between North Atlantic and adjacent waters. They gather valuable data for studying drift patterns and deterioration rates of icebergs. Observations of the Ice Patrol and the ships are processed through a computer and the data will be used to build a dynamic model of the North Atlantic. The model is an integral part of any oceanic prediction system. It is needed to solve the iceberg detection and surveillance problem.

Can the "white monsters" be destroyed? To date, they have resisted fire-bombs, gunfire, and chemicals. Relentlessly, the Greenland glaciers grind their way to the sea, and the bergs detach themselves into the North Atlantic. So far, the Coast Guard says the most practical defense against them is to watch their movements.

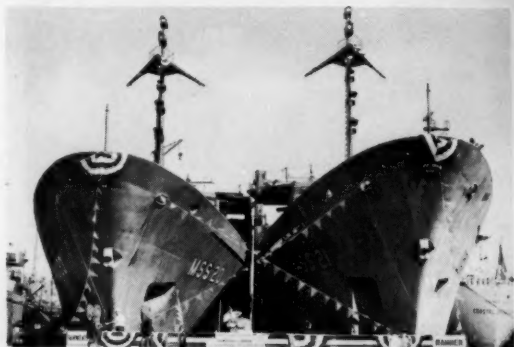
17 Nations Contribute

The 1967 Patrol is a tribute to the foresight of the participants in the First International Safety Conference held at London in 1913. The Conference recommended the formation of an "International Ice Observation and Ice Patrol Service" under U. S. administration. In 1914, the job was given to the U. S. Coast Guard.

At present, 17 nations contribute to the Patrol on a "pay-as-you-benefit" basis: Belgium, Canada, Denmark, France, Germany, Great Britain, Greece, Italy, Japan, Liberia, Netherlands, Norway, Panama, Spain, Sweden, the United States, and Yugoslavia.

TWO SURVEY SHIPS LAUNCHED

Two \$4,000,000 hydrographic survey ships were launched March 15 in Jacksonville, Fla., by the Environmental Science Services Administration (ESSA), U. S. Department of Commerce. The vessels are the USC&GSS "Fairweather" and "Rainier." The 231-foot 1,627-ton ships are being constructed for ESSA's Coast and Geodetic Survey. They are designed to chart U. S. coastal waters to help provide safe navigation for commercial shipping and recreational boating.



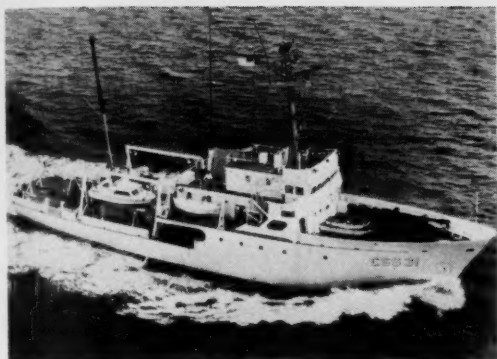
Preparing launching ceremonies for the two new survey ships USC&GSS Fairweather and Rainier. (Photo: ESSA)

The ships are scheduled to be completed later this year. Another vessel of the same class, the USC&GSS "Mt. Mitchell," was launched November 1966 and also will be completed this year. The 3 vessels will replace others being retired.

The Fairweather and Rainier will have welded steel hulls strengthened for navigation in ice. Each will be propelled by twin-screw diesel engines through reversible-pitch propellers controlled either from the engine room or the bridge. The engine room will be monitored via a centralized automated system. A bow thruster will facilitate better ship control while on station or when docking. Each ship will be equipped with the latest electronic, depth recording, and positioning equipment.

"DAVIDSON" COMMISSIONED

A new hydrographic survey ship, the USC&GSS Davidson, of ESSA was commis-



New hydrographic survey ship USC&GSS Davidson. (Photo: ESSA)

sioned March 10. The 175-foot, 996-ton vessel brings to 14 the number of hydrographic survey, ocean survey, and wire drag ships in ESSA's fleet.

The ship was launched at Norfolk, Va., last May 7. She is designed for hydrographic coastal surveying, including the setting up and support of shore parties, and also has limited oceanographic facilities.

The Davidson is equipped with specialized depth recorders and positioning systems. She is built of welded steel construction strengthened for navigation in ice and will be propelled by diesel engines, with twin-screw, controllable-pitch propellers. The vessel has accommodations for 6 officers and 30 crew.

The Davidson is a sister ship of the USC&GSS "McArthur," commissioned in December 1966 at Norfolk.

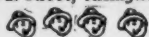
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MARINE TECHNOLOGY SOCIETY TO MEET IN JUNE

The Marine Technology Society (MTS) will hold its 3rd Annual Conference and Exhibit in San Diego, Calif., June 5-7, 1967. The theme: "The New Thrust Seaward."

The Conference will have 11 technical sessions of 60 papers on Federal, state, and regional aspects of oceanography; navigation and oceanography; minerals and mining; man-in-the sea; undersea materials; power sources; deep submergence; physical oceanography; and unmanned ocean systems.

Note: For more information contact Charles W. Covey, Suite 1000, 1117 N. 19th Street, Arlington, Va. 22209.



Foreign Fishing Off U. S. Coasts, February 1967

IN NORTHWEST ATLANTIC

Soviet: After a nearly 2½-month absence, the fleet resumed fishing off New England and New York. Soviet fishing this year began late in January. U. S. fishermen reported several stern trawlers conducting exploratory operations. Several days later, on Feb. 1, a small fleet of 16 factory stern trawlers and 2 support vessels was sighted in a concentrated area south of Montauk Point, Long Island (Hudson and Block Canyons). Moderate catches of fish consisted primarily of red hake and small amounts of whiting (silver hake). General servicing of the stern trawlers by support vessels was also noticed.

On Feb. 15, 1967, 33 Soviet fishing (21 stern trawlers, 9 medium trawlers) and support vessels were sighted 80-120 miles south of the Long Island-Cape Cod coast. They were widely dispersed on the edge of the Continental Shelf. The fleet was divided into 2 parts: one--11 factory stern trawlers--was engaged in what appeared to be a limited fishery for red hake. Small catches were observed on only 2 vessels; on others, the crews were repairing trawl gear. This part of the fleet was about 85 miles south of Montauk Point, Long Island, N. Y., on the western border of ICNAF's subarea 5 (71°29' W.).

The second fleet also was fishing for red hake, to the east of the first one (69°33' W.). It consisted of 10 stern trawlers and 9 medium side trawlers. Moderate to heavy catches were observed in the open storage areas on deck.

There was little or no evidence of whiting (silver hake) among the catches. Crewmen of the large side trawlers were bagging fish in sections of netting. Bags already filled and lashed together were heaped on deck for delivery to a nearby factory base ship of the "Pionersk" class, recently constructed for the USSR in Poland.

Dehydration plants were working on many stern trawlers.

No vessels were sighted outside the ICNAF Convention area.

During February, 41 individual vessels were sighted and identified as 25 factory stern trawlers, 9 large refrigerated side trawlers, 2 medium side trawlers, 3 refrigerated fish transports, 1 factory base ship, and 1 tanker.

The Soviets appeared at least moderately successful in the red hake fishery. But their fleet was less than half of the over 90 vessels reported in February 1966, so it is almost certain that total red hake catches are far below those of February 1966.

IN GULF OF MEXICO

Soviet and Cuban: U. S. shrimp vessels returning from fishing grounds in the southern Gulf of Mexico reported concentrations of Soviet stern trawlers and Cuban trawlers somewhat inside 12 miles off Cabo (North-easternmost point of Yucatan Peninsula, Mexico). They seemed to be after finfish not shrimp.

No foreign vessels were reported fishing off or near the U. S. Gulf Coast.

OFF CALIFORNIA

Soviet: Fishing off California in February was about the same as in January 1967: 1-4 fishing and support vessels were sighted each week about 14 miles off coast. No Soviet vessel was fishing within 9-mile contiguous fishery zone. On February 22, however, the U. S. Coast Guard permitted a 3,000-gross-ton refrigerated fish carrier "Dekastri," built in Sweden, to come within 4 miles off Point Reyes (in Drake's Bay, about 25 miles northwest of San Francisco) to accept the catches of two Soviet large stern trawlers (BMRTs "Kuba" and "Boris Gorinskii"). A Soviet tanker, the "Sinegorsk" was also allowed to enter the 9-mile fishery zone to re-fuel the fishing vessels. A Coast Guard cutter supervised the 2-day operation.

The small number of Soviet vessels indicates that for the time being the USSR is still conducting exploratory fishing. Most basic fishery research apparently has ended. The commercial vessels now are sampling to determine commercial potential.

During the weekly patrols, no Soviet vessel was observed fishing and no catch was seen aboard. As a result, there is no information as to species actually caught.

The fact they unloaded catches on a refrigerated fish carrier indicates good catches. From the knowledge of fishery resources present in areas of Soviet fishing, the California State Fish and Game Commission concluded that most catches are probably species of Pacific rockfish.

OFF PACIFIC NORTHWEST (Washington and Oregon)

Soviet: The vessels increased steadily during February--from 1 at the beginning to about 10 fishing, support, and research vessel by month's end.

Most fishing was off Oregon, although 1 research vessel was sighted exploring off Washington's coast.

Fishing off Oregon has been off Newport area. All vessels operated seaward off the 9-mile contiguous fishery zone. The catch primarily was Pacific hake. The best catch observed was on February 14, when one SRT landed 30,000-40,000 pounds of hake in one drag.

The greatest number (12) of fishing and support vessels was sighted during the surveillance flight in the fourth week, ending Feb. 23: 3 large stern trawlers, 6 medium side trawlers, and 3 support vessels (refrigerated fish carriers and tankers).

Two of the 6 medium trawlers were fishery research and exploratory vessels: one, the "Ogon," traditionally has conducted fisheries research in the northeastern Pacific for the Soviet Pacific Scientific Research Institute for Fisheries and Oceanography (TINRO); the other, the "SRTM-8437," is an exploratory research vessel of the Sakhalin Fisheries Administration.

The pattern of Soviet fishing shows an intensive exploratory activity. As in 1966, this should culminate soon in increased fishing off the Pacific Northwest.

Japanese: Two stern trawlers were exploring off Washington and Oregon coasts in February. Both ocean perch and hake were seen on the vessels.

OFF ALASKA

Soviet: About 130 vessels were fishing during February.

The Soviet Pacific perch fishery in the eastern Gulf of Alaska was continued by about 30 fishing and support vessels. One trawler was active on the Portlock Bank in the central Gulf; in the western Gulf, the fishery was continued by about 6 trawlers and one support ship.

Shrimp fishing on the Continental Shelf surrounding the Shumagin Islands was continued by at least 20 trawlers and 1 canning factory-ship. The shrimp catch during the first 20 days of February was nearly 4.9 million pounds, more than shrimp quota for the entire month.

Herring fishery in the eastern Bering Sea failed to develop this year. A few vessels (5 trawlers and 4 support ships) were fishing in mid-January. But, like 1966 and 1965, they failed to locate significant herring concentrations. This accounts for the many vessels (70) fishing for eastern Bering Sea flatfish. Because of the scarcity of herring stocks, the quota was not met.

The eastern Bering Sea flounder fishery was continued by about 50 trawlers and 20 support ships.

Japanese: About 31 vessels were fishing in Alaska during the month.

The Pacific ocean perch fishery on Albatross Bank was continued by the factory trawlers "Daishin Maru No. 12," "Yutaka Maru," and "Ryuyo Maru," supported by the reefers "Reiyo Maru" and "Haruna Maru."

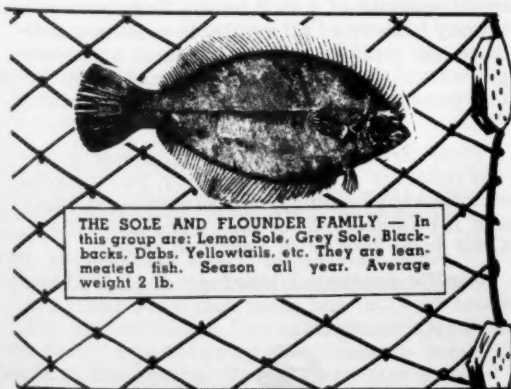
The Alaska pollock fishery north of Fox Islands was conducted by the factoryship "Chichibu Maru" (replaced by "Meisei Maru No. 2" about mid-month) and accompanying trawlers "Aso Maru," "Zuiyo Maru No. 2," "Akebono Maru No. 52," "Tenyo Maru No. 3," and "Inase Maru No. 5."

One longliner, the "Fukuyoshi Maru No. 35," fished for sablefish north of central Aleutians.

At the end of February, 2 king crab factoryships, the "Tainichi Maru" and "Keiki Maru," were reported en route to the king crab grounds in eastern Bering Sea.



NOTE: The first U. S. Fisheries Exposition at Suffolk Downs, Boston, Mass., will be held October 10-14, 1967--instead of October 7-14 as first announced by its organizers.



STATES

Alabama

1966 CATCH WAS UP

Alabama had total landings of 20,300,000 pounds of fisheries products in 1966 worth \$6,600,000. The 1965 figure was 17.8 million pounds worth \$5 million dockside.

Shrimp led with 10,600,000 pounds worth \$4,915,000, followed by food fish, 6,200,000 pounds worth \$888,000; crabs, 2,200,000 pounds worth \$80,000; and oysters, 1,300,000 pounds valued at \$617,000.



Alaska

KODIAK KING CRAB CATCH DECLINES

The catch of king crab per unit of effort in the Kodiak Island area has been declining since late 1966. Weather explains part of this. Some fishermen are considering a switch from king crab to Dungeness crab fishing.

There is some basis for the belief that the sustainable yield of some stocks could have been reached or passed during 1966. A computer program is being developed to analyze all tagging and recovery data collected since May 1961. The data may serve to define the geographical ranges of various stocks of king crab being taken in the Kodiak Island area.



California

RESOURCES AGENCY ISSUES REPORT

The trawl fleet made "exceptional catches of English sole" in the vicinity of the Klamath River and Pt. Reyes, states the recent report of the Resources Agency of California. A Eureka otter trawler caught a record 132,000 pounds of predominantly English sole in 3 fishing days. The captain and 3-man crew received \$10,552.82.

Rockfish landings were light at Eureka, and landings of bocaccio and chilipepper in

the Fort Bragg area were moderate. Landings at Monterey were below par, but catches off Morro Bay and Santa Barbara were moderate.

Monterey draggers complained of competition from 2 Soviet stern-ramp trawlers operating between Ano Nuevo and Davenport on productive grounds fished frequently by local vessels. One captain reported that while fishing 12 miles off Davenport, on February 16-17, he was sandwiched between 2 Soviet vessels. He reported both vessels with large hauls of rockfish taken with mesh smaller than the U. S. 4½-inch minimum size.

About 10 boats were fishing for crab in the San Francisco area--concentrated at Russian River, Bodega Bay, Pt. Reyes area, and in deeper water between Farallones and Pt. Reyes.

About 5½ million pounds of crab had been landed at Eureka, Trinidad, and Crescent City by mid-February. Total landings for the Fort Bragg-Crescent City area were expected to top 6 million pounds by month's end.

No Sardines for Terminal Island Canneries

The 1966/67 cannery season closed March 1, 1967--the poorest on record and the first in which no sardines were delivered to Terminal Island canneries. Statewide landings during the cannery season were estimated to be under 175 tons. Nearly all of the fish were sold for bait because of the higher price of \$200-400 per ton. Catches during the past season were almost all large, old fish and primarily fish mixed with mackerel or very small schools of ¼ to 3 tons. The Resources Agency believes "all available evidence indicates our sardine population is at a seriously low level with the prospect of significantly improved catches in the near future extremely dim."

February had good weather and jack mackerel landings increased nearly 200 percent over January landings. Total mackerel landings for January-February were above those of the same period in 1965 and 1966.

Pacific mackerel landings remained low (about 60 tons) and most fish were landed at fresh fish markets.



Hawaii

BOOK INDICATES NEW TUNA RESOURCES

A very large potential fishery resource exists in the central Pacific Ocean, states a new, 266-page book published by the State of Hawaii. The book, "Proceedings of the Governor's Conference on Central Pacific Fishery Resources," is based on a Hawaiian conference of last year. A dozen scientists reviewed the knowledge of Pacific tuna fisheries and estimated their potential increase. Sponsored by Hawaii and BCF, the conference was chaired by John C. Marr, BCF Area Director, Hawaii, and Michio Takata, Director, Hawaii Division of Fish and Game.

A large stock of unfished skipjack tuna in the central Pacific holds the most promise; it is untouched, except by the small Hawaiian fleet. (Skipjack are widely caught by the Japanese in the western Pacific and by California-based vessels off Mexico and Central America.)

A theory advanced by Brian J. Rothschild, BCF Biological Laboratory, Honolulu, suggests that the spawning grounds of the eastern Pacific skipjack lie somewhere in the equatorial central Pacific. They move to American shores early in their lives and support an annual catch of about 70,000 tons. After less than a year there, they return to the central Pacific to spawn.

Skipjack and Yellowfin Catches Can Be Increased

Rothschild and Ralph P. Silliman, BCF Biological Laboratory, Seattle, estimated that at least 150,000 tons of the valuable skipjack might be taken annually. This would almost double the entire present U. S. tuna take.

The conference group on yellowfin tuna agreed that if methods could be devised to harvest yellowfin tunas smaller than those now taken by the Japanese longline fleet, the U. S. catch of this valuable species could be increased by about 50,000 tons a year, worth about \$12.5 million to U. S. fishermen. The group was chaired by Garth I. Murphy, Department of Oceanography, University of Hawaii, and Jerome Pella, Inter-American Tropical Tuna Commission, La Jolla, Calif.

The prospects for increasing the bigeye tuna catch, now taken by the Japanese longliners in the central Pacific, are less prom-

ising. Ralph P. Silliman and Vernon E. Brock, Dept. of Oceanography, University of Hawaii, estimated that the catch could not be increased materially.

The key to the problem of greatly expanding the fisheries is the development of new techniques and gear to harvest the new stocks economically. Dayton L. Alverson, Base Director, BCF Exploratory Fish and Gear Research Base, Seattle, and Albert L. Tester, Department of Zoology, University of Hawaii, agreed that the present Hawaiian industry could be stimulated by new approaches to bait handling and gear. Tapping the new resources requires study of tuna behavior--particularly the kind conducted by BCF's Honolulu Laboratory with sonar equipment aboard its research vessel "Townsend Cromwell."

The new book also contains background papers reviewing research results on tunas throughout the Pacific.



Mississippi

1966 LANDINGS DECLINED

Mississippi's landings in 1966 were 255,021,000 pounds worth \$8,594,000. In 1965, the total was 371.2 million pounds valued at \$9.6 million.

Industrial fish, including menhaden, composed the bulk of landings. They totaled 240 million pounds worth \$4,340,000. Other landings were: food fish, 4,100,000 pounds worth \$930,000; shrimp, 7,335,000 pounds at \$340,000; crabs, 1,374,000 pounds valued at \$97,000; and oysters 2,220,000 pounds at \$586,000.



North Carolina

CALICO SCALLOP INDUSTRY IS ACTIVE

The North Carolina scallop industry reported in mid-March that it was producing calico scallops at the rate of 10 million pounds a year. On March 13, twelve vessels produced 98,000 pounds of calico meat. This fishery developed with BCF technical assistance and the cooperation of State and local interests.



Oregon

WINTER SALMON CATCH WAS GOOD

The best chinook landings since 1953 and the largest steelhead take since 1961 marked the recently completed winter commercial fishing season on the Columbia River, reports Herman P. Meierjurgan, Oregon Fish Commission chairman. The season opened on February 15 and ran through March 1. Preliminary estimates show that 7,280 spring chinook weighing 148,900 pounds and 9,900 steelhead weighing 97,200 pounds were taken. The figures include total fish landed at both Oregon and Washington points. The average catch for the winter season from 1959 through 1966, when it was shortened to its present two weeks, was 4,700 chinook and 7,500 steelhead.

Landings during the winter season are of little value in predicting the spring chinook run, Meierjurgan said. Unpredictable weather and variation in the timing of the spring chinook run, especially of this early part of the run, prevent any useful comparison of landing figures with other years. Last year, for example, much bad weather kept fishermen off the Columbia during part of the season; more favorable weather during the recent season permitted more fishing.

Spring Season To Be Set Soon

There is less fishing intensity in winter than later in the year, Meierjurgan said. Winter season activity is centered on the lower river with little effort given to drifts above St. Helens.

A decision on the spring commercial season on the Columbia River will be determined in the latter part of April. Then, the Fish Commission and the Washington Department of Fisheries will hold a joint public hearing, and set the spring season--based on the latest available biological data.

COHO RELEASED

Some 10 million yearling coho were slated to be liberated into Oregon waters last month. Since 1958, an average 7.6 million of such young salmon (smelts) have been liberated from Oregon Fish Commission hatcheries. Of the 10 stations rearing coho, 4 are on the coast and 6 on the Columbia River.

Ernest R. Jeffries, the Commission's fish culture director, said that the Commission cannot claim all credit for excellent coho fishing, both sport and commercial, during the past few years, but it is convinced that the coho releases have given the runs a substantial boost. Good ocean survival conditions are an extremely important factor in maintaining good salmon runs, Jeffries noted.

The fish have spent their first year in fresh water and are ready to migrate to the ocean. They will remain there until the spawning urge sends them back into the rivers on the spawning run. Some smelts will return in fall 1967 as jacks, 2-year olds, but most will not return until fall 1968 as fully mature 3-year olds.

Hatchery Production Being Evaluated

This year is the first of a 2-year program to evaluate the contribution of hatchery production to the sport and commercial fisheries. Ten percent of the 10 million coho are marked with an identifying fin-clip. The same percentage of coho production in Washington hatcheries and U. S. Fish and Wildlife Service hatcheries also are marked in a Federal-state financed program to determine where and how many of their fish are harvested.



Washington

HAKE FISHERY IN PUGET SOUND SHOWS PROMISE

Five vessels were fishing in mid-March for Pacific hake in the Port Susan area of Puget Sound, Washington. All 5 were using midwater trawls and telemetry systems designed and developed by BCF's Exploratory Fishing Base in Seattle. The vessels were delivering their catches to pet food and fish meal processors in LaConner, Bellingham, and Everett, Washington.

This seasonal hake fishery started in late November 1966 and is expected to continue until May 1967. By mid-March, over 6 million pounds had been landed. The season's total is expected to reach 12-14 million pounds. In 1966, this area's production was 6¼ million pounds.



BUREAU OF COMMERCIAL FISHERIES PROGRAMS

THE SUBMARINE "PISCES" AS A FISHERIES TOOL

By William L. High*

BCF's Exploratory Fishing and Gear Research Base, Seattle, Wash., chartered the two-man submarine *Pisces* for 6 days in October 1966 to determine its usefulness in fisheries research. Twenty-nine dives were made to depths between 90 and 552 feet in Puget Sound, Wash. Although the ascent and descent rates were variable, an average ascent from 300 feet took 6 minutes. We observed gear performance, fish behavior, plankton distribution, and currents and found the submarine well suited for numerous research objectives.

On the negative side, visibility often was limited, the sub was unable to effectively follow a midwater trawl--and one of the most frustrating aspects of observing from a submarine was the inability to capture, identify positively, and examine the animals sighted. Scientists must soon develop suitable sampling devices, especially for those submarines with external manipulators.

The *Pisces*, completed in 1966, is the first of several to be constructed by the Canadian firm, International Hydrodynamics, Ltd. BCF's aims in chartering it included: (1) Provide orientation dives by Bureau personnel to evaluate the suitability of small submarines for fishery investigations, (2) observe the behavior of Pacific hake (*Merluccius productus*) under natural conditions and the influence of lights and capturing gear, and (3) determine whether the submarine could be operated near pelagic trawls.

PROCEDURES

Submarine activities were confined to Saratoga Passage, a weather-protected area within Puget Sound, Wash., where large concentrations of hake occur. Each morning, the *Pisces* was lowered into the water from a large barge equipped with support facilities and towed to the nearby dive location with a 30-foot power launch (fig. 1). The pilot and the first observer of the day boarded before launching and used the tow period for pre-dive system checkout and observer orientation. On later dives, observers were transferred while the *Pisces* floated on the surface.

*Assistant Chief, Gear Research Unit, BCF, Exploratory Fishing and Gear Research Base, Seattle, Wash.

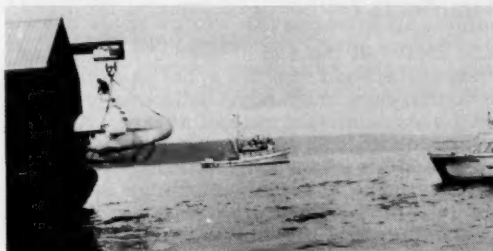


Fig. 1 - The *Pisces* being lowered into the water from the support barge and towed by the "Hudson Explorer" (right) to the nearby diving location. The Bureau's vessel "John N. Cobb" (center) provided additional support services.

DESCENT: The submergence procedure required about 10 minutes because buoyancy is altered by transferring oil from bladders to spheres. The sink rate is controlled by manipulating oil level within the spheres; however, the rate usually was about 30 feet per minute to permit observations of plankton layers and midwater fish species. The *Pisces* could readily suspend in midwater.

SUBMERGED OPERATIONS: Once the vessel was on the bottom, the equipment was

checked out, and oil was shifted by electric pump to provide neutral buoyancy. Fore and aft tilt of the submarine was achieved by actuating a hydraulic ram that moved the battery case along a short track.

Voice communication was maintained at all times with the launch, which homed on the voice signal using a directional transducer.

The life-support system functioned very well. The submarine interior was always dry. No headaches or other physical discomforts were experienced.

Every 45 minutes, the atmosphere was analyzed for CO₂ content and relative humidity. At no time did the CO₂ level exceed 0.9 percent. A small blower was actuated intermittently to force the air through CO₂ and moisture scrubbers. After the blower ran 5 minutes, CO₂ was reduced to less than 0.4 percent and relative humidity from 90 to 55 percent. Oxygen was introduced by a hand-operated valve. Although water temperature was 52° F., internal air temperature never dropped below 58° F. The sphere contains a heating system, but it was not needed during the dives.

ASCENT: At the end of each dive, oil was again transferred from the spheres to bladders to increase buoyancy. This method provided a slow, constant rate of ascent. A more rapid ascent could be made by also introducing compressed air into a doughnut-shaped ballast tank beneath the fiberglass cowling. Air was fed in until positive buoyancy was reached and the submarine lifted off bottom. The ascent rate increased from 0.3 to 2.0 feet per second as the air expanded to fill the collar during the ascent. Total ascent time from 300 feet averaged about 6 minutes.

With the protective sail around the hatch opening, it was convenient to transfer personnel without lifting the submarine from the water. Observers were easily transferred to the submarine in a 1-foot chop. Observers could be exchanged, the Cardroxide CO₂ scrubber replaced, and the submarine underway again in less than 10 minutes.

The *Pisces* was towed back to its barge at the end of each day. Batteries were recharged overnight and other routine maintenance undertaken.

RESULTS

Twenty-nine dives were completed during the 6-day charter. Had a second pilot been available, the number of dives--or the average time per dive--could have been increased. The hours of operation depend on the amount of power used to propel the submerged submarine. The average dive was to 256 feet and for 56 minutes. However, one 2-hour dive reached 552 feet.

Weather was generally good and did not hamper activities. Low water visibility did restrict several aims. In near-surface layers, objects could be distinguished at 15 to 20 feet, but in deeper waters and near the bottom, visibility at times was reduced to 3 feet.

Several factors contributed to the *Pisces*' inability to effectively follow a midwater trawl towed by BCF's research vessel John N. Cobb. The magnetic compass reacted too slowly to be effective. Turns were made by varying the speeds of the two side-mounted motors. It was difficult to control a turn because of the submarine's momentum once a turn began. Heavy discharge rates on the batteries during high power maneuvers greatly restricted the running time. Available power was used up in a short time.

Twenty-two persons made dives in the *Pisces*. Although the primary aim of most was to familiarize themselves with the submarine and its potential use, some noteworthy observations were made: Hake, spiny dogfish (*Squalus acanthias*), ratfish (*Hydrolagus coliei*), flounders (several species), and shrimp (several species) were noted on most dives. Walleye pollock (*Theragra chalcogrammus*), shiner perch (*Cymatogaster aggregata*), Pacific tomcod (*Microgadus proximus*), rockfishes (*Sebastes* spp.), and crabs (*Cancer magister*) were seen less often.

Hake Not Affected By Sub Or Lights

Three dives were made near a midwater trawler that was catching up to 20,000 pounds of hake per 90-minute tow. During the first two dives, a few hake were observed near the bottom. After the sub reached bottom, all motors and lights were turned off for several minutes, then the lights were again turned on.

Apparently, hake were not affected either by the submarine or its powerful lights. On the third dive, the trawler made an echo sounding trackline directly over the submarine. The resulting echogram, as evaluated by the captain, indicated fish to be abundant from the bottom up to a distance of several fathoms, but the observer saw no hake. The pilot and observer saw numerous dogfish 25 to 30 fathoms below the surface. Near bottom, the observer saw a heavy concentration of various large plankton and a few cods, probably Pacific tomcod or walleye pollock.

During many dives, juvenile hake were found between 28 and 60 fathoms. Although they did not appear to be schooled, several often were seen at one time. These fish were about 2 to 5 inches long. The bodies appeared pink, but this may have resulted from the submarine's lights.

These hake were drifting with the tide in either a head-up or head-down attitude. Every few seconds they would assume a horizontal position and swim erratically for a short distance, stop, and return to the heads-up or down position. Those drifting close to the bottom sometimes would begin their swim and hit the bottom. These hake may have been feeding for they were seen snapping at unidentified objects.

View From The Sub

Definite phototaxis (movement of organisms toward light) was shown only by one fish species, shiner perch, on one dive to 96 feet. A large school accumulated when the Pisces settled on the bottom with its lights turned on. The school dispersed after the lights were turned off for about 3 minutes, then regrouped when the lights were turned on again. As the Pisces began ascent, the shiner perch followed to about 30 feet off the bottom.

Plankton and debris were abundant at all depths. Whenever the Pisces was stationary, plankton quickly gathered around the lights. Few distinct plankton layers were noted, but certain forms were definitely absent from some levels. During the night dive to 552 feet, larger species appeared after the sub descended beyond 100 feet. A thicker layer of plankton and silt extended from 480 feet to the bottom.

Numerous holes were seen in the mud bottom. The smaller ones, up to about 3 inches in diameter, seemed created by marine forms other than clams; however, no animals were detected. At 552 feet, several holes about 6 inches in diameter and at least 5 inches deep were seen. No detectable activity or water currents originated from the hold, although the Pisces remained quiet for 30 minutes and lights were extinguished several times for periods up to 10 minutes. Silt and other debris carried across the bottom by strong currents probably would fill the holes within a few tidal cycles, if some animal did not clean them.

Phosphorescent activity varied between dives. Usually, it was most apparent when the darkened submarine lay on the bottom with a strong tide running. Distorted current patterns caused by the sub's presence were illuminated by the phosphorescent marine forms.

Tidal currents at 200 or more feet often were quite different from surface currents. On one occasion, an estimated $1\frac{1}{2}$ -knot current flowed on the bottom while the surface was at slack water. Direction of flow sometimes was 180° from that on the surface. As the bottom current increased, silt was picked up and created a muddy layer up to 30 feet off bottom.

Modifications Could Improve Pisces' Performance

Some aspects of fishery research from Pisces-like submarines are feasible. Biological surveys can be successful, especially on rough bottom areas not suitable for conventional sampling gear. Plankton types, and their distribution within a water column, can be studied. By operating at reduced power, stays of 24 hours or more would be practical.

The Pisces now is equipped with a 1,500-pound skid. By altering or removing the skid, large instrumentation packages could be accommodated, or a third man could easily be carried within the sphere, although his vision through the viewing ports would be limited.

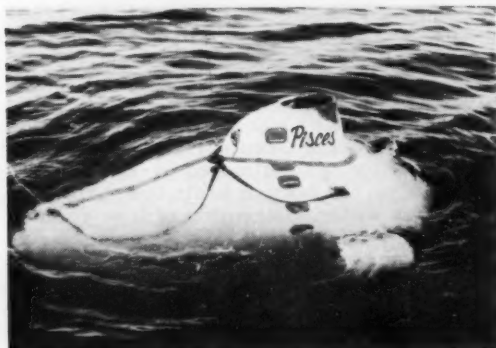
The system of buoyancy control used in the Pisces has several distinct advantages: (1) Costly weight need not be dropped after each dive, or installed before each descent;

and (2) the submarine can stop at any mid-water depth, then readily rise or descend any number of times during a dive.

Additional attempts to follow trawls may be worthwhile if a gyrocompass, more precise steering, and increased speed and power are provided. Nonmobile fishing gear, such as crab pots or longlines, probably can be viewed effectively.

Equipment scheduled for future installation includes: A direct reading current meter, a depth telemetry system, gyrocompass, and an improved submarine tracking system that will operate independently of the voice communication system.

THE PISCES



The Pisces is a two-man submarine designed to operate at depths up to 4,800 feet. The pressure sphere has an inside diameter of 76 inches, permitting ample space for pilot, observer, and more instruments. Two viewing ports situated forward give each man 130° vision ahead of the submarine. A smaller port permits a camera to be mounted permanently between the viewing ports.

The Pisces is relatively portable. Overall, it is 16 feet long, 11 feet wide and has a gross weight of about 14,000 pounds. Payload capability is about 1,500 pounds.

Present instrumentation includes echo sounder with forward and bottom transducers, magnetic compass, two external pressure gauges, submersible-to-surface voice communication, two 1,000 watt external quartz-iodide lights, internal-external thermometers, 16-mm. cine camera, and a tape recorder. For the 6 days it was chartered, a

Government-owned depth telemetry system was installed.

The life support system includes Cardroxide¹/ CO₂ scrubbers, supplemental oxygen storage tank, CO₂ analyzer, humidity meter and dryer, and emergency rebreathers. Environmental endurance is calculated at 290 man-hours.

¹/Trade names mentioned do not imply endorsement of commercial products.



BCF Reactivates Vessel Mortgage Insurance Program

For the first time since November 1966, when the program was forced to mark time for lack of funds, BCF is taking applications for fishing vessel mortgage and loan insurance. A notice in the "Federal Register," March 7, 1967, made public that the authorization for outstanding mortgage insurance on fishing vessels had been increased to \$20 million.

The program provides for the insurance of mortgages and loans to construct, reconstruct, and rebuild vessels. The mortgage's face amount cannot be more than 75 percent of the work cost. Maturity cannot exceed 15 years, nor can the interest rate be over 6 percent.

Since the program began in 1960, \$10 million have been made available to strengthen the fishing fleet.

More information may be obtained from BCF regional offices.



Interior Awards 18 Oceanography Study Grants

The Department of the Interior has awarded to 18 universities graduate educational grants totaling about \$200,000. The 2-year grants, part of the National Oceanographic Program, will be available for the 1967 fall term. The universities select deserving students who are graduates or about to be graduated.

The program was started in 1962 to help develop scientists in fishery oceanographic subjects. Administered by BCF, the program makes \$200,000 available each year. Scientists assist Interior Department in selecting universities for the grants.

Grants were made to 12 schools in 1962, 17 in 1963 and 1964, 18 in 1965, and to 19 in 1966. Applications for the 1967 awards came from 49 institutions in 33 States.

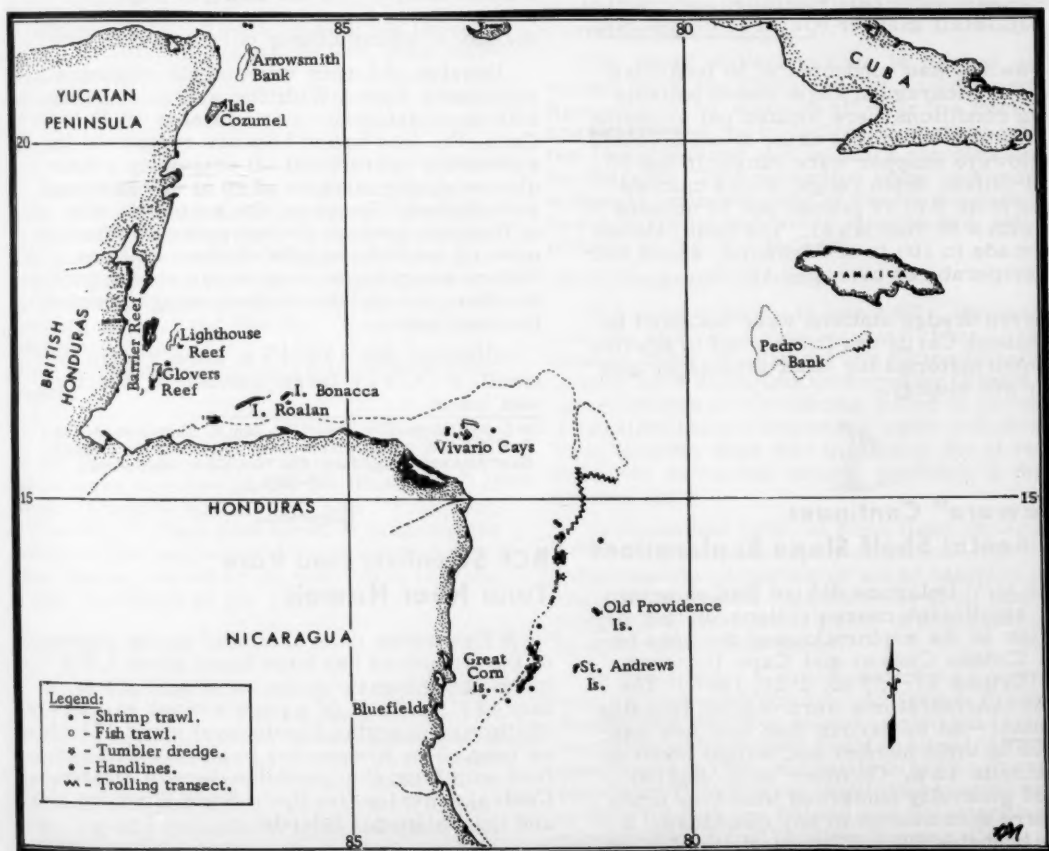
Students apply for grants to the schools they wish to attend. The grants provide for payment of tuition and fees and living expenses of \$3,000 a year. Married students with children also receive a family allowance of \$1,000.



"Oregon" Finds Commercial Amounts of Pelagic Fish

The results of the Oregon's 39-day cruise in the western Caribbean indicate significant commercial concentrations of pelagic fishes available to conventional gear (Cruise No. 115, ended Feb. 24).

Cruise objectives were: (1) to continue seasonal exploratory fishing coverage in the western Caribbean with emphasis on trawling, trolling, handlining, and dredging off the coasts of British Honduras and Nicaragua; and (2) to cooperate with the United Nations Special Fund Caribbean Fisheries Project by providing at-sea training for observers from British Honduras, Bonacca Island, and Jamaica.



R/V Oregon pelagic fish exploratory Cruise 115.

Trawling near Vivario Cays, off Honduras and outside currently used fishing grounds, produced light catches of grooved shrimp. Nighttime catches of 6 to 13 pounds (heads-on) of pink shrimp were made per 90-minute drag with a 60-foot shrimp trawl.

Red Snapper Fishing Encouraging

Fishing for red snapper was conducted with handlines and reels off British Honduras, Honduras, and Nicaragua with encouraging results. Several species of snapper and grouper were found distributed throughout the area. The 3 most abundant were yelloweye snapper, blackfin snapper and red snapper. These species were caught on handlines. Other snapper species captured on handlines were dog snapper (*Lutjanus jocu*), lane snapper (*Lutjanus synagris*), grey snapper (*Lutjanus griseus*), black snapper (*Apsilus dentatus*), vermillion snapper (*Rhomboplites aurorubens*), and yellowtail snapper (*Ocyurus chrysurus*).

Trawling was conducted at 30 localities along the Nicaraguan slope where suitable bottom conditions were located out to depths of 158 fathoms. In this area, small amounts of yelloweye snapper were caught in the 60 to 110-fathom depth range, where catches ranged from 0 to 62 pounds per 60-minute drag with a 60-foot trawl. The best catches were made in 100 to 110 fathoms, where bottom temperatures averaged 18° C.

Eleven dredge stations were occupied to help assess Caribbean fauna--and to provide specimen material for other studies in technology and biology.



"Delaware" Continues Continental Shelf Slope Explorations

The M/V Delaware did not find commercially significant concentrations of fish or shellfish in its explorations of the area between Hudson Canyon and Cape Hatteras, N. C. (Cruise 67-1, Feb. 2-21, 1967.) The largest concentrations were dogfish (*Squalus acanthias*)--so numerous that one net was lost due to their number and weight taken on a 30-minute tow. On other sets, dogfish seemed generally numerous wherever other fish were encountered in any quantities. It seems probable that fish productivity of these waters might be increased if this species were removed.

Cruise 67-1 completed coverage of this area begun on Cruise 66-11 (Nov. 29-Dec. 15, 1966). The purpose of 67-1 was to determine the occurrence and abundance of fish and shellfish species available to trawl gear. Most of the survey stations originally scheduled for winter sampling have been fished. The same stations will be fished again during a future summer period (and possibly spring and fall as well) to show the changes that occur in fish abundance and seasonal availability.

Procedure: The stations sampled were arranged in transect lines extending across the slope of the bottom from near shore to deep water over the Continental Slope. The sampling stations were 10, 20, 35, 50, 75, 100, 200, and 400 fathoms along each line. Twelve transect lines were plotted between Hudson Canyon and the offing of Cape Hatteras. These lines divide the area into subdivisions, which loosely correspond in size.

Results: 59 sets were made--54 were successful tows. With the exception of the 100- to 400-fathom stations east of False Cape, Va. (not fished because restricted for submarine operations) all originally scheduled sampling stations of 10 to 400 fathoms were fished. However, the excessive loss of flotation gear on the net prevented fishing most of the 600- and 800-fathom stations. Future sampling of deep-water stations will be attempted on later cruises using improved flotation gear.

Although the catches were generally small, a fairly large number of species was taken.

For further information contact Dr. John R. Thompson, Acting Base Director, or Ernest D. McRae, Jr., Exploratory Fishing & Gear Research Base, State Fish Pier, Gloucester, Mass., 01930, Telephone: 617-283-6554.



BCF Scientists Find Rare Tuna Near Hawaii

A fish whose natural habitat is the shores of the Americas has been found about 3,000 miles from home--in the waters off the island of Hawaii. It is a female black skipjack (*Euthynnus lineatus* Kishinouye) about 17 inches long. The species has been reported before only from the coastal waters of Mexico, Central America, northern South America, and the Galápagos Islands.

The fish was taken by BCF's research vessel "Charles H. Gilbert" about 35 miles west

of Hawaii in a mixed school of skipjack tuna and small bigeye tuna. The discovery was made by Walter M. Matsumoto, Biologist, and Tagay Kang, Biological Technician, of BCF's Biological Laboratory, Honolulu.

Matsumoto and Kang offer 3 possible reasons for the rare catch: (1) The black skipjack is found more widely in the oceans than had been known. (2) This fish might simply be a stray from the eastern Pacific Ocean. (3) It may be that the species is beginning to spread from its known habitat.



She Casts Her Net Across The Tropical Pacific

From a quiet office adjoining the University of Hawaii campus in Honolulu, Mrs. Mary Lynne Godfrey supervises a data-gathering network that covers millions of square miles of the entire tropical and subtropical Pacific Ocean.

Mrs. Godfrey is Chief of Scientific Services, BCF Biological Laboratory, Honolulu. A staff member since 1950, she supervises young, college-trained technicians who collect and process the basic data the laboratory uses in its studies of the fisheries and oceanography of the Pacific. Mrs. Godfrey originated some of the widely used methods of recording biological data for machine processing.

Most of the laboratory's technicians work at the Dole Street Laboratory unless required to make voyages on the two research vessels: "Charles H. Gilbert" and "Townsend Cromwell." They take turns at manning the laboratory's two field stations--one in American Samoa, the other in the Palau Islands, Trust Territory of the Pacific.

They Start Early

At 5 o'clock in the morning, every day except Sunday, a BCF technician joins the fish handlers and buyers at Honolulu's two fish auctions. He measures and observes the daily catches of boats from the Oahu-based, 22-boat, longline fleet. The fishery technician rapidly records weights, lengths, and sex of the tunas and marlins. He may also draw samples of tuna blood or collect gonads or stomach contents.

At five in the evening, 5 days a week, two technicians wait at the tuna cannery at Kewalo Basin as the pole-and-line caught skipjack are unloaded and trundled in for processing. They, too, select randomly and make length, weight, and sex measurements and collect blood samples.

Early or late, whenever and wherever pelagic (ocean) fish are unloaded in any quantity, BCF has tried to be there to collect data that will further its studies. Work starts at 6 a.m. for the man stationed in American Samoa, where Japanese, Korean, and Chinese fishing boats unload their catches at two busy canneries in Pago Pago.

In April 1965, in cooperation with the Trust Territory of the Pacific Islands and the newly established fish freezing plant in Koror, Palau Islands, the laboratory started similar sampling of fish taken in that area of the Western Caroline Islands.

The study of Pacific tuna is further advanced by a knowledge of its environment. Agencies with stations all over the Pacific are assisting in the collection of surface water temperatures and salinity samples for the Bureau. This collection leads to a more complete understanding of the movements of ocean currents and water masses and, ultimately, of the fish in them.

When Program Started

The project began in late 1953. Working with the District Commissioner of the Line Islands District, Gilbert and Ellice Islands Colony, BCF scientists arranged for Gilbertese employes on Christmas Island to gather the desired temperatures and water samples. Mrs. Godfrey says this important set of records has continued almost unbroken to the present time.

In November 1955, at Koko Head on Oahu, BCF Honolulu Laboratory employes began a twice-weekly collection of water samples for chemical analysis. Like the water at all sampling sites, Koko Head water is characterized by open-ocean conditions.

In early 1957, a weekly sampling program was begun on Wake Island, French Frigate Shoals, and Midway Island. Johnston Island was followed by Manele Point on Lanai, American Samoa in 1961, and Guam in 1962. From each island, the Bureau is obtaining useful sets of data through the helpful and longstanding cooperation of the Weather Bureau, Coast Guard, Navy, Departments of Agriculture of both Guam and the Government of American

Samoa, and the Hawaii Division of Fish and Game.

In addition to data from sampling sites on land, BCF uses material from two ocean weather stations. The Weather Bureau and the Coast Guard have made possible the collection of daily surface water temperatures and weekly water samples from Weather Stations Victor (34°00' N., 164°00' E.) and November (30°00' N., 140°00' W.).

Under Mrs. Godfrey's supervision, millions of items of data collected from this wide area are standardized and punched on cards for machine analysis by specially trained operators.



Their Road Show Abroad Stars Fish

When they appeared in London the first time, on January 18, 1966, one British agent representing one U. S. firm was on hand. When they returned February 14, 1967, that agent was working for 4 U. S. firms--and there were 4 other agents, each representing a U. S. firm, and still others seeking to take on U. S. fishery products.

Between the 2 dates, the members of BCF's Office of International Trade Promotion (OITP), Sam Hutchinson, A. L. "Gus" Morel, and L. F. "Nip" Reynolds, had staged their shows in Italy, Austria, Germany, and France.

OITP travels abroad to expand the markets for existing U. S. fishery products--and to promote new products. Their showcases consist of high-quality frozen and canned fishery products conveniently packaged. Included are such species as Alaska king crab, whitefish caviar, shrimp, lobsters, lisa, salmon, pasteurized crabmeat, and squid.

So far, the program has concentrated on Western Europe because that area is enjoying a rising standard of living. European visitors to the fairs have warmed to the processed, packaged, and convenient fishery products. These products have shown that they can compete for the housewife's attention and money. For many housewives, serving a lobster dinner, shrimp as hors d'oeuvre, or some other gourmet items reflects the new prosperity.

U. S. exhibitors have learned that there is a burgeoning market for American fishery products.



Fig. 1 - "Incredible!" The expression on the face of this leading French importer says: "Incredible". He was looking at the display of fresh fish, a subordinate part of the exhibit, at Pompano, Spanish mackerel, mullet, swordfish, ocean trout, and scallops. He added: "Unique! How can they be so fresh?"

The cool man on the far left is Sam Hutchinson, Head of the Office of International Trade Promotion.

Program Aids Small U. S. Firms

OITP works with the U. S. Department of Agriculture to participate in the fairs. USDA handles the background work--survey of area, time of fair, location--and invites between 2,000-3,000 top tradesmen in the host and neighboring countries. These include importers, brokers, distributors, agents, and institutional operators.

The International Food Trade Fairs have provided U. S. firms their largest audiences at the least expense. The U. S. processor has only to send his product and pay the freight and duty on the samples he ships. The OITP provides a display booth, audience of top trade people, advertising, and personnel to coordinate the promotional efforts. The OITP specialist assists the foreign importer in preparing inquiries and passes them on to U. S. firms able to quote prices and supply the items.

If the small U. S. firm worked alone, the cost of just renting space and paying the dec-



Fig. 2 - U. S. frozen fishery products at U. S. Trade Center Exhibition, London, England. Tempting American fish products were shown in 6 of these deep freeze units and upright cases. Sampled by the visitors were such tasty products as king crab, scallops, shrimp, lobsters, fish wieners, chub fillets, stuffed flounder, smelt, seafood baskets, crab sticks, and shrimp burgers.



Fig. 3 - U. S. frozen fishery products at the U. S. Trade Center Exhibition, February 14-23, 1967, London. English importers saw, tasted, and ordered American fishery products that were attractively displayed, high in quality, and competitive in price. Shown here in BCF's display cabinets are Alaska king crab, breaded fantail shrimp, dungeness crab, shrimp (individually quick frozen), and Maine lobsters.

orator, electrician, and staff would amount to \$1,500 to \$2,500. By working through OITP, his bill is about one tenth this figure. It is a real good deal to promote his company's product abroad.

The Box Score

To date, 10 fairs have produced nearly one million dollars in sales for U. S. firms. The OITP staff projects a figure twice this amount as a result of these efforts. Some firms have sold the bulk of their seasonal inventory; in two instances, the demand was so large that it could not be met. After a sale of 150 tons of shrimp in London, orders for an additional 50 tons of shrimp and 5 tons of king crab had to await later delivery.

The fairs also are an ideal meeting place for U. S. firms seeking trained foreign agents, and vice versa. They give the U. S. exporter a chance to carry on business face to face. In London, over 80 importers, buyers, and

agents signed registration sheets expressing interest in U. S. products and asking for more information. Many of these persons desire to represent U. S. firms.

Meatless Frank Makes Appearance

At the Milan (Italy) Trade Center, 12 U. S. firms supplied 30 different species of frozen, canned, and processed fishery products. Some were known to the Italian market--frozen squid, shrimp, and king crab meat. Others were new--carp roe from the Great Lakes, caviar made from whitefish, canned lobster morsels, canned lisa, canned codfish cakes, frozen chub fillets, and Maine lobsters frozen by a liquid nitrogen process. But the hit was a frankfurter made entirely of freshwater fish. It looked like, tasted like, and was eaten like a meat wiener.

While the frankfurt was a smash in Milan and London, it moves this month to its toughest audience--the one in Frankfurt, Germany.



WATER: THE VITAL ESSENCE

"Three-quarters of the earth's surface is covered by a compound about which man has known very little until recently. Whether falling as spring rain, racing by as a mountain stream, or lying still and black in the Marianas Trench, water has generated, surrounded, and supported life as we know it. More and more, it is becoming the key to new physical knowledge about the planet.

"Water: The Vital Essence," by Peter Briggs (232 pp., printed, \$5.95 a copy. Harper and Row, Publishers, Inc., 49 East 33rd Street, New York, N. Y. 10016) "provides a broad picture--an introduction to the global sea and the freshwater rivers flowing into it, the submarine rivers which move beneath its surface, and the expanding science of oceanography. It offers the layman a review of what is known about underwater geology--the unseen landscape--origins of life on land, the sea as a potential source of energy and food. The reader is also faced with society's very real problems of maintaining an adequate supply of usable fresh water, a subject of tremendous importance for a geometrically increasing population. Everybody can't live upstream."

FEDERAL ACTIONS

Corps of Engineers

DENIES DREDGE PERMIT IN FLORIDA

On March 14, the U. S. Corps of Engineers denied a permit for dredging and filling in Boca Ciega Bay, Florida. The Corps decision was based on the harmful effects of the proposed operation on fish and wildlife resources and the public interest--and its inconsistency with the purposes of the Fish and Wildlife Coordination Act and the Florida Board of Conservation.

The "St. Petersburg Times" cites the decision as a landmark. It is the first time that concern for fish and wildlife resources has been the basis for denying a permit. Before, the Corps of Engineers concerned itself primarily with the effects of dredging and filling on navigation.



Department of Health, Education, and Welfare

FDA WILL REQUIRE MORE PRECISE PACKAGE LABELING

The Food and Drug Administration has proposed regulations requiring every food package to state clearly and exactly "how much" and "what" the customer is buying (The "Federal Register," March 17, 1967). The regulations were formulated under the 1966 Fair Packaging and Labeling Act (PL 89-755) effective July 1, 1967.

The regulations would ban such misleading words as "jumbo quart" or "full gallon."

They would require:

- Listing the form in which a food is offered--"whole, slices, diced, etc."
- Expressing quantities in pounds and ounces, or in gallons, quarts, pints, and fluid ounce subdivisions.
- Labeling packages containing less than four pounds in both ounces and pounds and fractions of pounds or ounces. Example: "A declaration of 1½ pounds weight shall be expressed as "net wt. 24 oz. (1 lb. 8 oz.)," "net wt. 24 oz. (1½ lb.)," or "net wt. 24 oz. (1.5 lb.)."

A package of less than one gallon would be labeled in the largest whole quart or pint; the remainder would be given as a fraction or in fluid ounces.

- Listing ingredients under their common or usual name "in order of decreasing predominance" (in order of amounts).
- Accompanying any statement of the number of servings by the quantity of each serving--"in terms of weight, measure, or numerical count."
- Outer containers, such as "six-packs," to bear the mandatory label information for the product.
- The name and address of the "manufacturer, packer, or distributor" to appear on the "principal display panel" of the package.



Treasury Department

CUSTOMS DETERMINES USSR NOT DUMPING FISHERY PRODUCTS

A tentative determination was made by the U. S. Treasury Department that shrimp, lobster tails and lobsters, fresh frozen or cooked frozen, imported from the Soviet Union, are not now nor are likely to be sold at less than fair value within meaning of Antidumping Act of 1921. (Published in "Federal Register," January 31, 1967.)

In March 1966, the Treasury Department was informed that imported Soviet fishery products were being sold at less than fair value. To check this, the Bureau of Customs began an inquiry based on provisions of the Customs Regulations. Also, it published an Antidumping Proceeding Notice in the "Federal Register," April 19, 1966.

Checked Purchase Price and
Constructed Value

The determination was based on evidence that, for fair value purposes, the appropriate bases for comparison are purchase price and the constructed value of the imported Soviet shrimp. Customs found that the purchase prices of shrimp were in no instance lower than their constructed value.



INTERNATIONAL

FAO Aids 15 Caribbean Countries

Two fishing training vessels of the Food and Agriculture Organization (FAO) became the first of their kind in November 1966 to cross the Pacific under the white-and-light blue United Nations flag. The "Alcyon" and the "Calamar" docked in San Diego, Calif., in November 1966, after a 30-day crossing from Japan. They sailed later for the Caribbean to study the area's marine resources and to train fishermen as part of a major FAO fisheries project of the UN Development Program.

The steel-hulled vessels were built at Yokosuka, Japan. Each is 81 feet long overall, has a capacity of 137 gross tons, and a maximum speed of 11 knots. Both are equipped for side trawling and have a three-ton trawl winch with a hauling speed of 148 feet per minute.

Accommodation is provided for a crew of 10 with more space for 8 trainee fishermen. A small fish hold has a 1,500 cubic foot capacity and is refrigerated down as far as -5° C. (23° F.) using Freon 12 as a refrigerant.

Outline of Project

The "Alcyon" is based at Kingston, Jamaica, and the "Calamar" at Bridgetown, Barbados, headquarters for the FAO project. Participating states and territories are Barbados, Guyana, French Guiana, Guadeloupe, Martinique, Jamaica, the Leeward Islands, Netherlands Antilles, Surinam, Trinidad and Tobago, Grenada, St. Lucia and St. Vincent, the Dominican Republic, and Puerto Rico. Though 12 of the 15 participants are island countries, or constitute chains of islands, none catches as much fish as it needs. Nutrition is generally poor and quality protein is the element most lacking in the diet.

Present Caribbean fishing methods are usually more picturesque than productive. Marketing and distribution are inefficient. There are not enough trained people to exploit the Caribbean's rich fisheries potential. The aim of the 4-year project, therefore, is to build a sound base for future fisheries development. This is to be accomplished through exploratory fishing, marketing studies, and training.

FAO has subcontracted the exploratory fishing phase of the project to BCF. This part of the project will concentrate on areas considered the Caribbean's most promising: The waters off northeast South America, the southern Caribbean, and the grounds along the island chain running from Grenada to Jamaica.

The marketing studies are designed to improve local methods of processing, handling, storage, and distribution of fishery products. They also will explore the possibilities of a Caribbean export trade.

Training will be of great importance. The FAO experts plan to train officers and master fishermen, both ashore and aboard the project's vessels, with courses organized periodically throughout the area.

Total cost of the project will be US\$2.7 million, US\$1.9 million of it contributed by the United Nations Development Program and US\$800,000 by the governments.

FAO's Growing Fleet

The Alcyon and Calamar are the third and fourth training and exploratory fishing vessels to be built for FAO in Japan and form part of a growing fleet of such boats. The first 2 FAO-UN vessels built in Japan were the "Chin Da Li," a 300-ton tuna long-liner, and the 150-ton trawler "Kae Na Li," both named after Korean flowers. They were completed in 1965 and are now in service with the Deep Sea Fishing Training Centre at Pusan, Korea.

The Pusan project chief has reported that the Chin Da Li, manned by Korean trainees who take turns at all shipboard tasks from deckhand to skipper, has registered an average daily tuna catch above that of commercial vessels from Korea and Japan. It turned in a US\$4,000 profit on her first voyage.

Two other vessels are being built in Japan. They are 96-ft. purse seiner/traulers due for delivery this year. They will be assigned to FAO-UN fisheries projects in the Philippines and East Pakistan.

The cost of the 6 Japanese-built boats is about US\$1.3 million, paid for in Japanese yen. ("Fishing News International," Jan. 1967.)



Fish Meal Exporting Countries Consider Regional Quotas

The Fish Meal Exporters Organization, made up of representatives from Peru, Chile, Norway, Iceland, Angola, and South Africa, is planning regional quotas for shipments of fish meal. These countries account for about 90 percent of world exports of fish meal. Only a specific amount would be exported to each continent, but the quota for the United States is open ended.



Japan and USSR Exceeded 1966 Pacific Salmon Quota

In 1966, Japan caught 101,177 metric tons of salmon (zones A & B combined) and the USSR 56,223 tons, according to the Japanese Fisheries Agency. Japan surpassed by 5.4 percent the quota of 96,000 tons decided at the 1966 Japan-Soviet negotiations. The USSR exceeded by 12.4 percent its goal of 50,000 tons--the first time since 1956 that it exceeded the planned quantity in an even year, normally poor for salmon.

In 1966, the Soviets insisted that salmon resources in the Northern Seas were the smallest in history due to recurring poor catch years. So the Japanese accepted a drastic quota reduction and severe restrictions. However, the catches of both nations were high and the coastal fishing of the USSR especially surpassed the plan considerably. This represents Soviet expansion and also implies that resources were not so scarce as thought. These developments will help Japan in future debates on resources. ("Nihon Keizai," March 2, 1967.)



German-Greenlandic Gear Conflict Increases

Incidents between small Greenland gill-netters and large German trawlers in international waters near Greenland appear to be

increasing. The skipper of a Greenland vessel recently reported losing 22 long lines and nearly been run down by 2 German trawlers. An official of the Royal Greenland Trade Department notes that Greenland's enforcement vessels cannot intervene because the fishing areas are in international waters. He said protests through diplomatic channels had failed to produce results and, if the incidents recur, Greenlanders will be forced to consider whether to continue fishing in the area. ("Aktuelt," Feb. 27, 1967.)



World Fish Meal Output Rose 13% in 1966

World fish meal production in 1966 increased about 13 percent over 1965. Output rose substantially in Peru, Chile, and Norway, but declined in the U.S. Most principal producing countries submit data monthly to the International Association of Fish Meal Manufacturers.

Country	Nov. 1966	Dec. 1966	Jan.-Dec.	
			1966	1965
 (Metric Tons)			
Canada	5,413	8,363	88,344	90,387
Denmark	8,964	4,049	107,915	111,189
France	1,100	1,100	13,200	13,200
German Fed. Repub.	6,265	5,428	73,443	67,555
Netherlands	1/	1/	2/1,510	5,894
Spain	1/	1/	1/	3/ 34,000
Sweden	940	483	6,189	7,076
United Kingdom	6,343	6,004	85,906	80,845
United States	17,026	10,391	4/179,101	4/219,807
Angola	5,917	5,016	54,670	47,668
Iceland	20,520	18,567	181,842	172,073
Norway	18,463	2,172	421,725	309,149
Peru	2,337	187,319	1,470,478	1,282,011
So. Afr. (including S.-W. Afr.)	7,990	1,006	257,565	272,388
Belgium	375	375	4,500	4,500
Chile	2,149	3,872	194,221	70,352
Morocco	1/	1/	5/21,300	19,290
Total	103,802	254,145	3,161,909	2,807,384

1/ Data not available.
 2/ Data available only for January-April 1966.
 3/ Estimated.
 4/ Does not include shellfish meal.
 5/ Data available only for Jan.-Sept. 1966.
 Note: Japan does not report on monthly basis at present. In 1965, her production was 356,000 metric tons, according to FAO's "Yearbook of Fishery Statistics, 1965" vol. 21.



FOREIGN

CANADA

TIGHTENS SEALING REGULATIONS

For the Gulf of St. Lawrence sealing season opening March 7, 1967, the Canadian Government planned to have snow vehicles, 4 helicopters, and more protection officers supervising the hunt.

The Minister of Fisheries explained that the sealing regulations had 2 purposes: one, conservation, the other, strictest control over the manner seals are killed.

The types of firearms and ammunition that may be used to shoot adult seals are clearly defined; so too are the weight and length of the hard-wood clubs used in taking young seals. Sealers may carry the traditional gaff for personal safety, but cannot use it as a weapon. One underlined section states that a seal must not be skinned until there is positively no doubt that it is dead.

Quota and Rules Set

If a violation occurs, a fishery officer now can suspend the license of offenders up to 30 days. In the Gulf area, sealing may only take place between 6 a.m. and 6 p.m. daily, thus confining the hunt to daylight hours.

As in 1966, a 1967 quota of 50,000 has been set in the Gulf for young harp seals commonly known as whitecoats. Killing hood seals and adult harp seals on the breeding patches is prohibited.

A protocol bringing harp and hood seals under international control has been approved by the International Commission for the Northwest Atlantic Fisheries. This will lead to international conservation measures outside the Gulf of St. Lawrence. Inside the Gulf, sealing in 1965 and 1966 was exclusively

Canadian. (Canadian Department of Fisheries, Ottawa, Feb. 24, 1967.)

PLANS WEST COAST FISHERY RESEARCH LABORATORY

The Canadian Government has acquired a site in West Vancouver, British Columbia, to develop a major marine research center, the Fisheries Minister announced February 23, 1967. He described the plans of the Fisheries Research Board for the new area as "long-range," leading in the next decade to the development of one of the nation's finest water laboratories. Facilities will be made available for research on live fish in fresh and salt water.

The new laboratory will operate as part of the Fisheries Research Board's Vancouver Laboratory. (Canadian Department of Fisheries, Ottawa, Feb. 23, 1967.)

HER EXPLORATORY WHALING WITH JAPAN IN ATLANTIC IS SUCCESSFUL

The whaling company Kyokuyo Hoge sent a 750-ton whaling vessel to Newfoundland in May 1966 at the request of the Canadian Government. The vessel took 170 whales (20 above its goal) and produced 2,400 metric tons of meat and oil. The company now plans a joint coastal whaling venture with Canadians in that area.

It was reported in December 1966 that Taiyo also had established a joint whaling company in Canada and would send a 470-ton whaling vessel to Newfoundland. The vessel's target for 1967 (June-September) is 175 blue whales.



LATIN AMERICA

Mexico

FISHERY DEVELOPMENT PLANS

In early 1966, a fisheries advisory commission pointed to the slow increase in the Mexican catch. Its recommendations prompted the government to announce a national development program aimed at raising landings by more than 160 percent--to nearly 500,000 metric tons a year.

The commission observed that Mexican fishing progress has been haphazard and poorly balanced; the industry is too dependent on export markets for shrimp and a few other species.

Shrimp will feature in plans to increase exports from 66,000 metric tons (1964) to 144,000 tons. But Mexico also hopes to increase output of nonfood marine products from 7,000 tons to 61,000 tons. Fish meal will make up nearly 50,000 tons of the 1970 total.

With this drive to increase the catch, Mexico also will encourage its people to eat more fish. Estimates for 1970 put per capita consumption at least at 5.8 kilograms (12.76 pounds).

Large Investments Planned

To achieve its 1970 targets, Mexico plans an investment in fishing of 334 million to 396 million pesos (US\$26.7 million to \$31.7 million) in the next 4 years. Of the higher sum, 234.3 million pesos (US\$18.7 million) will be drawn from current revenue provided by the State; of the remaining 161 million pesos (US\$12.9 million) about 60 percent will be sought abroad and 40 percent at home.

The investment will build larger vessels able to work far out at sea and new processing plants and better facilities for handling wet fish; improve export and domestic marketing methods; help apply improved fishing techniques; and train fishermen.

The program also undertakes the reform of laws governing fisheries and fishing cooperatives, and of regulations presently taxing commercial fishing and the fish trade. It

seeks the coordination of government agencies dealing with fishing under the National Advisory Commission on Fishing. The Commission will be given executive power to direct the development plans it has outlined. ("Fishing News International," Jan. 1967.)



Brazil

PRESIDENT VETOES FISHERIES CODE LEGISLATION

On January 18, President Castello Branco vetoed the entire revision of the fisheries code approved by the Brazilian Congress. He said that amendments had so distorted the Administration's original text that partial veto was impossible. Another revision of the obsolete 1938 Fisheries Code is being prepared by the numerous government agencies concerned with the fisheries industry.

The President stated that the bill approved by Congress was contrary to the national interest. He pointed out that Article 8 of the original draft he presented to Congress in September 1966 permitted foreign vessels to fish in Brazilian waters when authorized by Executive Decree. As revised by Congress, Article 8 was limited to firms with headquarters in Brazil that would be permitted to charter foreign fishing vessels for one year, renewable for only another year, then the vessels either were to be nationalized or cease fishing in Brazilian waters. This wording, according to the President, destroyed the flexibility desired by the Administration.

Financial Burden To Government Excessive

The President also stated that the fiscal incentives for investment in the fisheries industry that the original bill provided now would be too great a burden for the Treasury to bear on top of the recently granted 25 percent wage increase for civil servants. To be able to meet that additional new expense, without issuing more currency, the government is reducing fiscal incentives granted other activities under previous legislation. Accordingly, incentives for the fisheries industry are no longer justified. (U.S. Embassy, Rio de Janeiro, Feb. 9, 1967.)

Brazil (Contd.):

LEAFLET DISCUSSES MARINE FISHING
IN NORTHEAST BRAZIL

The fishing industry, like most others in Northeast Brazil, is technologically and commercially far behind those of most developed countries, according to a new leaflet on the region. Many available resources are unexploited; processing and marketing facilities are few. Lobster is found along the Continental Shelf off the states of Ceara, Rio Grande do Norte, Paraiba, and Pernambuco. The report includes catches of various species, development plans of SUDENE (Superintendency for Development of the Northeast) and tables on vessels, processing companies, fishing colonies, warehouses and cold storage plants.

Note: FFL-69, "Marine Fishing in Northeast Brazil," is available free from the Branch of Foreign Fisheries, BCF, Room 8015, U. S. Department of the Interior, Washington, D. C. 20240.



Cuba

MEXICO SEIZES VESSELS

On Feb. 6, 1967, a Mexican Coast Guard patrol boat seized 6 Cuban fishing vessels inside Mexico's territorial waters near Progreso, Yucatan Peninsula. The boats are being held at Progreso while the Mexican Government considers further action.

* * *

FISHES OFF ARGENTINA

The "Guasa," a Cuban freezer trawler recently purchased from Spain, has returned to the new fishing port of Havana after a 2½-month trip to the Patagonian Shelf. Commanded by a Soviet fishing captain, the vessel had 460 metric tons of southwest Atlantic hake.

* * *

CUBA AND USSR AGREE ON
SERVICING SOVIET VESSELS

Cuba and the USSR have agreed on the servicing of Soviet fishing vessels by Cuban enterprises of Havana's fishing port. This

will improve the work of the Soviet fishing fleet in the southwestern Atlantic and permit full-capacity use of fishing port facilities. The agreement was signed by V. V. Sokolov, representative of the USSR Ministry of Fisheries in Cuba, and Alvaro Lavastida Rosado, director of the Havana fishing port. ("Tass," Feb. 16, 1967.)



Argentina

SOVIET FISHING CAUSES PROBLEMS

Several Argentine high-seas fishing vessels returned unexpectedly to Mar del Plata complaining that the physical presence of large Soviet fishing vessels makes their fishing difficult and hazardous. The Argentine captains lodged a protest with the local National Maritime Prefecture claiming they were unable to fish for the same schools of fish since Soviet fishermen use the "mass concentration of vessels" technique, and that high waves created by larger Soviet vessels endangered the smaller Argentine vessels.



Peru

SETS CLOSED SEASON
FOR ANCHOVY FISHING

On February 11, 1967, as a conservation measure to protect the anchovy (*Engraulis ringens*), the Peruvian Government published supreme decree no. 16. This ordered: (a) current fishing season--September 1, 1966, to August 31, 1967; (b) closed fishing season--February 15, 1967, to March 14, 1967; and (c) financial assistance for small and medium-size fish-meal producing firms during the closed season be given by the Industrial Bank and Ministry of Treasury and Commerce.

A recommendation on limiting the anchovy catch to 8 million metric tons during the current season is expected to be made in May 1967 by the Ocean Institute (Instituto del Mar). Possibly, the Ocean Institute may recommend an increase in catch if environmental factors are favorable. Some producers favor increasing the permissible catch. However, at the current rate of fish meal production,

Peru (Contd.):

and sales allocations by the end of May 1967, stocks may stand at over 750,000 tons. (U.S. Embassy, Lima, Feb. 13, 1967.)

4 GROUPS WILL SELL FISH MEAL

The independent fish meal producers of Peru account for about 50 percent of the total national production. They were expected to organize into 3 groups similar to the Peruvian Fishery Consortium (Consortio Pesquero del Peru) to obtain more favorable market prices for fish meal produced. Besides the Peruvian Fishery Consortium, these similar organizations were expected to be functioning soon: (1) The National Union of Fish Meal Producers (Sindicato Nacional de Productores de Harina de Pescado S.A.), (2) the Association of Fisheries (Pesqueros Asociados S.A.), and (3) the Fish Meal Producers Association (Asociacion de Productores de Harina de Pescado S.A.). ("Pesca," Nov. 1966.)



Chile

200-MILE LIMIT RESERVATIONS

A Chilean Foreign Ministry official recently said that Chile's adherence to the 1952 Declaration of Santiago is as firm as ever, but she does not actually claim sovereignty over the 200-mile zone. Rather, she claims jurisdiction for the exclusive purpose of protecting natural resources.

A recent editorial in "Diario Ilustrado" contends that Chile's position must be aligned with that of Peru and Ecuador, which make no reservations in their claim to full sovereignty. It also noted Argentina's recent adoption of a 200-mile maritime jurisdiction. (U.S. Embassy, Santiago, Feb. 1, 1967.)



Ecuador

SEIZES JAPANESE TUNA VESSEL

The Ecuadorean Navy seized the Japanese tuna long-liner "Chiyo Maru No. 15" (410

gross tons) February 17, 1967, on charges of violating the 200-mile territorial waters. On February 24, the Government announced that the vessel owners would be subject to a fine of US\$12,777.60--and the vessel would be confiscated if payment was not made by March 1. Also, Ecuador is requiring the purchase of a \$2,640 license and a fishing fee of \$200 if the vessel desires to continue fishing inside territorial waters.

This is the second Japanese fishing vessel seized by Ecuador on charges of illegal fishing. The first incident occurred 3 years ago. ("Minato Shimbun," Feb. 28 & 19, 1967.)



Colombia

CONSIDERS 200-MILE TERRITORIAL SEA

A Colombian Senate committee has approved a bill extending territorial waters to 200 miles. The full Senate reportedly was scheduled to vote on the bill the week of Feb. 19, 1967. (Bogota, Feb. 16, 1967.)



Panama

REQUIRES SAILING PERMIT FOR FISHING VESSELS

Panamanian Law No. 5, January 17, 1967, requires a "sailing permit" ("zarpe de pesca") for shrimp boats and fishing vessels over 10 gross tons leaving Panamanian ports for shrimp or any other fishing operation. (Foreign ships of this size may be affected.) Although no charge is levied for the permit, tax stamps of US\$20 and \$40 must be affixed to sailing permit applications for shrimp and fishing vessels using nets, respectively. For other fishing activities, the tax stamp will also be \$20 or \$40, depending on the fishing operation. Craft under 10 gross tons are exempt.

This sailing permit is no substitute for a fishing license. A valid fishing license must still be held by the operator of a fishing craft.

Applicants must present these documents to support their request: (a) sailing permit application in duplicate; (b) certificate of inspection for vessel; and (c) list in triplicate

Panama (Contd.):

of crew and passengers, if any. Applications will be available from head of Department of Fisheries, Ministry of Agriculture, Commerce, and Industries in the near future. Ship operators will normally obtain applications from the Ministry. The local official of Department of Fisheries in a port will issue the sailing permit; in ports with no Department representative, the Port Inspector, Mayor, or other local magistrate, in order of availability, will be the issuing officer.

Law Designed To Raise Funds

The sailing permits will be valid for 30 days. The law provides for semiannual inspection of all affected craft and enforcement of the sailing permit requirement. Also, for the present, no increase in shrimp vessels licensed to operate will be allowed. The present total is 232, virtually all Panamanian owned. Presumably, the issuance of an operating license to a new shrimp vessel would be possible only if one now active retired.

The law is designed to raise additional funds to "contribute to the realization of" Panama's participation in the 6-year FAO study of Central America's fisheries potential underwritten by the U.N. Development Program. Participating countries, including Panama, have contributed to it. However, the new law does not earmark proceeds of the sailing permit tax stamps in any way. Apparently, Panama's contribution to the study eventually will be taken from the regular budget of the Fisheries Department. (U. S. Embassy, Panama, Feb. 17, 1967.)



El Salvador

1966 SHRIMP LANDINGS WERE RECORD

A new BCF leaflet discloses that during 1966 El Salvador's shrimp fleet landed a record total of over 11.9 million pounds--40% above the previous record of 1961 and 43% above 1965. The catch of fish and other shellfish, taken incidental to the shrimp, also continued to grow; in 1966, it reached a record 3.9 million pounds.

While no sales figures are available, personal observation confirms increasing quan-

ties of fish and other seafood in local markets. Probably due to the increased availability of shrimp, less fishing effort was required in 1965 and 1966 than in most previous years. During 1965, an average 65 boats logged about 19,000 fishing days. During the first 11 months of 1966, 67 boats spent 19,000 days fishing.

The leaflet also discusses catch, exports and consumption, prospects, and a statistical table on the shrimp industry.

Note: FFL-113--"El Salvador Shrimp Industry, 1965-1966," is available free from the Branch of Foreign Fisheries, BCF, Room 8015, U. S. Department of the Interior, Washington, D. C. 20240.



Foreign Fishing Vessels Seized Off Latin America

In the second half of February, U. S. tuna vessels were seized off Ecuador and Peru; French vessels were arrested off Brazil; Cuban and U. S. vessels were seized off Mexico; a Japanese vessel was seized about 180 miles off Ecuador; and Soviet vessels off Argentina were required to adhere to the regulations of that nation's unilaterally established 200-mile maritime jurisdiction.

Vessel arrests off Latin American coasts are increasing and posing serious problems for several countries.



MID EAST

Israel

PLANS TUNA FISHING AND PROCESSING

Israel is reported seeking information from Japan concerning the economics of tuna vessel and tuna packing operations. The Marine Research Laboratory in Hiroshima was asked by the Israeli Science and Technology Information Center for data on production capacity and efficiency of tuna vessels, operating costs, types of fishing gear, and estimated investment and space requirements to build a tuna cannery with a processing capacity of 2,000-5,000 tons a year. ("Suisan Keizai Shimbun," Feb. 7, 1967.)



EUROPE

EUROPEAN PURSE-SEINE METHODS SPREAD TO DENMARK AND WEST GERMANY

The success of the Norwegians and Icelanders with the purse seiner has stimulated its increasing use by European fishing fleets. Recently, Denmark and West Germany put into service vessels using large purse-seine nets and power blocks.

In Denmark, the side-trawler "Else Horne," fitted with purse-seine equipment, has been landing good catches at Hirtshals, her home port. In December 1966, the 140-foot "Caroline Musholm" was delivered to Danish owners by a Norwegian shipyard. She is the first power-block purse seiner built for Denmark and the fishing fleet's largest vessel.

W. Germany Adopts Purse Seiner

In West Germany, the 825-ton trawler "Schellfisch" has been converted into a power-block purse seiner, the world's longest.

The vessel will debut on the herring grounds off Iceland. German trawler operators will then be able to compare the purse seine with the midwater trawl.

Another vessel able to fish purse-seine gear will soon enter service with the same fleet. She is the stern trawler/purse seiner "Milky Ekkenga," just completed at Woubrugge, Holland. Somewhat smaller than the "Schellfisch," she is about 560 tons and has $\frac{3}{4}$ length shelterdeck. She will be able to undertake bottom and midwater trawling operations--and purse seining. ("Fishing News International," Feb. 1967, and "World Fishing," Feb. 1967.)



USSR

SOVIETS FAIL TO REACH 1966 CATCH QUOTA

In 1966, the Soviet catch of fish, shellfish, marine mammals, and other aquatic products amounted to 6 million metric tons ("Pravda," Jan. 29, 1967, p. 2). The 1966 planned quota was 6.2 million metric tons, 10.7 percent more than the 1965 plan.

This is the first time since the 1950s that the USSR failed to fulfill the catch quota. In recent years actual landings surpassed planned catch by an average of about 5 percent, but this average was decreasing during 1964 and 1965.

The Pravda article, prepared by the Soviet Central Statistical Office, claimed fulfillment of the 1966 fishery catch quota by 100.7 percent. However, Soviet Minister of Fisheries A. A. Ishkov, writing in the official organ of the Ministry of Fisheries, "Rybnoe Khoziaistvo," January 1966, page 2, stated: "In compliance with the 1966 Plan for the Development of the Soviet National Economy, confirmed at the 6th session of the Supreme Soviet, the fishing industry will have to increase fishery landings to 6.2 million metric tons and the output of fishery products to 3.05 million tons." So, the 1966 catch reached only 96.8 percent of the originally set quota.

2.6 MILLION KING CRABS LANDED IN EASTERN BERING SEA

In 1966, the Soviet Union's Far Eastern fishermen landed 2.6 million adult male crabs and produced 104,754 cases (48 8-oz. cans) of canned crab meat. The Soviets fished in the eastern Bering Sea from March to June. They used 3 king crab factoryships accompanied by 9 net-setting medium side trawlers and 33 pick-up boats, the same number as in 1963-1965. Because they fished an additional month, there was a 15 percent increase from the 1965 canned pack of 90,020 cases.

The February 1965 U.S.-USSR King Crab Agreement set a quota of 118,600 cases for the 1965-1966 Soviet Eastern Bering Sea fishery. In 1965, the Soviets reached 75.9 percent of the canned pack quota, and in 1966 about 88 percent. During the recent 1967 negotiations, the U. S. suggested a 15-percent decrease in the Soviet Eastern Bering Sea pack, permitting the USSR to produce 100,000 cases of canned crab meat during the 1967 and 1968 seasons.

The Soviet Union will do her best to reach the quota despite the fact that the Eastern Bering Sea fishery is not very "profitable," especially when compared to highly "profit-

USSR (Contd.):

Soviet Fishing for King Crab in the Eastern Bering Sea (Bristol Bay), 1959-1966

Year	Months Fished	Number of Vessels				Tangle Nets Set	Average Time for Set	Male Adult King Crabs	Canned Pack ³
		Factoryships	SRT Medium Trawlers ¹	Motor Boats ²	Total				
						Tons	Hours	Lbs.	No. of Cases
1966	March-June	3	9	33	45	617,195	330.0	2,559,598	52,377
1965	April-June	3	9	33	45	618,689	132.5	2,225,567	45,010
1964	April-July	3	9	33	45	607,459	136.6	2,799,620	72,104
1963	April-July	3	6	33	42	536,139	162.1	3,019,417	76,369
1962	April-July	2	6	22	30	419,667	110.5	3,019,211	72,160
1961	April-July	2	6	21	29	387,976	128.1	3,441,314	73,154
1960	April-July	1	6	10	14	191,559	94.0	1,995,006	37,722
1959	July-Sept.	1	-	8	9	63,950	95.0	620,406	7,961

¹/Crew of 22, of which 10 are king crab fishermen.

²/Crew of 12, of which 10 are king crab fishermen.

³/Each case contains 96 $\frac{1}{2}$ -lb. cans.

Source: Ministry of Fisheries, USSR.

able" bottom fisheries in the Gulf of Alaska, off the Pacific Northeast, and in the Bering Sea. Canned king crab meat is one of the most important Soviet exports; in 1965, over 10 million rubles¹ worth were sold to Western European countries, 3 times higher than 1965 caviar exports, and about one-fifth the value of all fishery exports.

PACIFIC FISHERIES MAKE GEAR ADVANCES

The Experimental Design Bureau of the Soviet Far Eastern Fisheries Administration recently tested a new design for a detachable cod end. Soviet fishermen use detachable cod ends in their high-seas fishery operations. Full cod ends are left floating on the surface to be picked up later by refrigerated fish transports. Meanwhile, trawlers continue fishing.

Detachable cod ends are not used by U. S. fishermen, but West European fishermen use them extensively in high-seas stern trawler operations.

Soviet-made tuna long lines are another recent innovation of the Design Bureau. In the past, the Soviets bought long lines from Japan but, in early February 1967, the fishing gear plant at Nakhodka delivered to the Far Eastern tuna fleets the first tuna long lines made of domestic synthetic materials.

SCIENTIST DISCUSSES ATLANTIC RESEARCH

The December 1966 issue of the Soviet magazine "Niva" contains an interview with the Deputy Director of the Soviet Atlantic Scientific Research Institute for Fisheries and Oceanography (ATLANTNIRO). Here are some highlights:

"The ocean is not a forest, nor is the fisherman a hunter who can 'comb' a wood in an hour or so in search for game. For this reason a diversified network of specialized scientific research institutes has been set up to help the fishermen. The field of our explorations is virtually boundless--the world ocean which covers more than 70 percent of the surface of the earth. Fishing is a widely developed industry providing employment for at least 100 million people all over the world.

"Soviet fishery scientists have 'divided' the vast expanses of the seas and oceans into several zones: the Pacific Ocean is the province of the Vladivostok Fisheries Institute; the Norwegian Sea and the North Atlantic of the Murmansk Institute of Polar Studies; and the Caspian Sea of the Astrakhan Institute of Fisheries. ATLANTNIRO covers the remainder of the Atlantic from 23° North down to Antarctica. About 15 or 20 years ago we had a staff of only 20 scientists who were engaged in the study of the southern Baltic Sea. Today the catch has increased considerably, consequently our institute has expanded too..."

USSR (Contd.):

It Locates and Studies Fish

"Our institute is a branch institute. Its main object is to locate and study fish. More than 20 specialized research vessels cruise far from home the year-round exploring the seas. But their activity is not limited to exploration alone. Locating fish is not the same as catching fish which migrate in search of zones abounding in food.... Our scientists study the oxygen content in ocean water, they measure its temperature and establish its salinity. This apparently mechanical collection of information, conducted with great patience and care, makes it possible to establish the typical behavior of fish and the dependence of fish on the medium."

"There is a very good term for defining the character of our investigations. It is 'long-term exploration.' It means that the research vessels are sometimes compelled to operate intensively as regular fishing vessels. For instance, if fish has been located in zone A it is necessary to find out what kind of fish, whether there is only one shoal or more, or there are several local shoals. Perhaps, it might be a whole school of fish. To find the answers to these questions the zone is carefully explored. The scientists study the food conditions which are so important in determining the behavior of fish, the relief of the bottom, and the composition of the sea bed. In short, the probable fishery is described in the greatest detail.

"At the same time fishing is conducted on a commercial scale to ascertain the potentialities, the number of vessels that can operate there simultaneously, and the length of the fishing season. It is difficult to overestimate the significance of such recommendations. It is worth noting that economic considerations are not the least important...."

Designing Fishing Gear

The Soviet scientist discussed the work of various laboratories and the important role of the Laboratory for the Experimental Design of Fishing Gear:

"The designers, electronic engineers and gear experts have set themselves the following goal: to design fishing gear which would enable the master or engineer to perform all fish-hauling operations from the bridge. The

readings on the instruments would show him the depth to which the trawl has been submerged, they would show whether the trawl is open, and whether it has been filled with fish. Despite the fact that the trawl is still the main catching gear, there is still much that we do not know about its operation. For instance, we do not yet know how the fish behaves after it has been caught. To know this you must see the trawl in operation. Our designers are using a special underwater glider equipped with lighting instruments, cameras and movie cameras. When towed, the glider is worked by an operator who observes the behavior of the fish in the trawl and registers it on movies. We have thus discovered very interesting and important details which are essential for the designers of fishing gear...."

RESEARCH VESSEL RETURNS FROM SOUTHWEST ATLANTIC

The large stern factory trawler "Gizhiga," a research vessel of the Atlantic Scientific Research Institute for Fisheries and Oceanography (ATLANTNIRO), returned to the USSR in January 1967 from a long voyage to the southwestern Atlantic. During the 34,500-mile trip, its scientists studied 16,000 fish, and conducted 440 experimental trawlings and over 300 bottom soundings. Preliminary analysis of the research shows that rich fishery resources exist in the area. ATLANTNIRO intends to continue the studies.

In March 1966, the Gizhiga docked at Aberdeen, Great Britain, for fresh water and stores. The Soviet scientists visited the Marine Laboratory at Torry, where they compared notes on deep-water fishing.

In late summer 1966 Soviet fishing vessels began to exploit fishery resources off Argentina.

SENDS RESEARCH VESSEL TO NORTHWESTERN ATLANTIC

The flagship "Sevastopol" of the Polar Scientific Institute for Fisheries and Oceanography (PINRO) left Murmansk at the end of February 1967 for a research cruise to the northwestern Atlantic. The main purpose will be to study the locations of commercial concentrations and feeding and spawning habits

USSR (Contd.):

of cod, ocean perch, haddock, and other species off Labrador and Newfoundland. The northern boundary of the warm Gulf Stream and its effect on fish populations also will be studied. The vessel will resupply at St. John's, Newfoundland, where Soviet scientists will meet with Canadian biologists of the local fisheries laboratory.

The Sevastopol traditionally conducts research, with the Soviet research vessels "Neptun" and "Topseda" in subareas 1, 2, and 3 of the International Convention for the Northwest Atlantic Fisheries. In 1965, her scientists studied the biology of cod, ocean perch, and haddock. By counting the young, the PINRO scientists hope to obtain data necessary for long-term catch forecasts.

Note: One of Sevastopol's 1966 cruises was reported in Commercial Fisheries Review, June 1966, pp. 91-92.

OCEANOGRAPHIC VESSEL
VISITS SENEGAL

On January 30, 1967, the newest Soviet oceanographic research vessel, "Akademik Kurchatov," docked at Dakar, Senegal, during her maiden voyage in the Atlantic. A. S. Monin, Director of the Soviet Institute of Oceanology and leader of the scientific party, held a press conference and described the research done. Over 1,000 persons visited the vessel's research laboratories during the 4-day port stay.

During the return trip to her home port of Odessa, the 6,800-gross-ton vessel stopped at Gibraltar, where the scientists met with the famous French oceanographer Cousteau.

Later in the year, according to the U. S. Embassy in Moscow, the vessel will be displayed at the Montreal World's Fair.

TUNA CONFERENCE
IS HELD IN LENINGRAD

In late January, or early February 1967, a conference on tuna fishing was held at Leningrad. Reportedly, it was sponsored by GIPRORYBFLOT, an organization of the Soviet Ministry of Fisheries in charge of new designs for constructing fishing vessels. The

participants reviewed the results of Soviet tuna fishing with 5 Japanese-built vessels and discussed the changes needed to improve the operation of the vessels. The conference decided that the Soviet tuna fishery should be developed further and new tuna vessels built.

HELPS YEMEN SET UP RED SEA PLANT

Yemeni newspapers report that the Soviets are helping Yemen set up a US\$11 million fish-processing plant in the Red Sea port of Hodeida. Earlier statements by the Yemen Government said the project would include a fish cannery, a freezing plant with a daily capacity of 55 metric tons, and storage for 1,000 tons of frozen fish.

Reportedly, the Soviets will supply 7 fishing vessels, and 14 to 16 technicians will accompany each vessel to train Yemeni fishermen. The processing plant is expected to provide an export surplus, part of which may go to the USSR as repayment for construction credits. (U. S. Embassy, Sanaa, Jan. 31, 1967, and other sources.)

STERN TRAWLER SINKS OFF DENMARK

The large stern trawler RTM-7002 "Tukan" sank on February 28, 1967, in the storm-swept Skagerrak Strait, a short distance from the Danish west-coast fishing port of Helsingor. The 2,368-gross-ton "Tropik"-class vessel, built in 1962, was the second in a series of 67 similar freezer trawlers built for the Soviets in East Germany.

Only 22 of the crew were saved; 57 fishermen died, some after being rescued. Survivors said the ship began to sink after being damaged by a violent cross-wave. The press attaché of the Soviet Embassy in Copenhagen reported that the vessel carried a deckload of heavy timbers which broke loose while crewmen were attempting to don life vests and launch lifeboats. Several crew members were injured by the shifting timbers, some severely. As a result, only 2 lifeboats were launched and many of the crew had to jump into the frigid waters.

The attaché said further that the Tukan will probably be raised.

USSR (Contd.):

Soon after the accident, the Soviet rescue tug "Strogii" took station above the sunken vessel. ("Berlingske Tidende," Mar. 2, 1967.)



Poland

REPORT ON
NORTHWEST ATLANTIC FISHERIES

Poland began to fish in the Northwest Atlantic in 1961. In that first year, about 4,000 metric tons of various species, mostly ocean perch (redfish) and cod, were landed (table 1). By 1965, over 56,000 tons (also mostly ocean perch and cod) were caught--14 times more than in 1961. The Northwest catch made up 20 percent of total landings of 280,097 tons in 1965.

Table 1 - Polish Catches in Northwest Atlantic, 1961-1965

Species	1965	1964	1963	1962	1961
(Metric Tons)					
Cod	21,720	10,865	7,736	4,161	1,222
Redfish	24,708	21,414	12,975	4,070	2,378
Flatfish	6,338	2,981	2,193	451	300
Other	3,862	2,583	344	439	23
Total	56,628	37,843	23,248	9,121	3,923

The Polish fleet in the Northwest Atlantic consists mostly of large stern factory trawlers (2,600 gross tons) constructed in Polish shipyards. They are equipped with 2,400 hp. motors and automated cod and ocean perch filleting lines capable of processing 50 metric tons of raw fish a day. The maximum freezing capacity of tunnels on a stern trawler is 30 tons of fish a day, while the fish meal plant can absorb about 25 tons of raw fish a day. (These data probably refer to three 8-hour shifts.)

In 1965, 11 stern trawlers caught over 50,000 tons of fish in the Northwest Atlantic--a yearly average of about 4,500 tons (10 million pounds) per stern trawler. The remaining 10 percent of the catch was landed by smaller trawlers which, in 1965, were used mainly in the herring fishery in the Gulf of Maine and off Nova Scotia.

They Fish The Whole Northwest Atlantic

The Poles fish throughout the Northwest Atlantic--from the tip of Greenland and the Davis Strait to Georges Bank off New England.

In 1965, the best daily average catches of factory trawlers were made off the coast of Labrador (subarea 1 of ICNAF) and the lowest on the Grand Banks (see table 2). If catches in one area are low during the year, the Poles prefer not to fish there the next year. This happened in 1962 on Georges Bank, and in 1963 off Nova Scotia. The average daily catch per factory stern trawler in 1965 was 25.9 metric tons (about 57,000 pounds). This high output justifies the expense of building and operating factory and freezer stern trawlers whose sea endurance is 90 days. The cost of building a high-seas fishing factory trawler equals that of 24 large cutters or 4 side motor trawlers operating in less distant grounds. The crew of a factory stern trawler is 11 times the crew of a fishing cutter and 3.5 times a side trawler's.

Table 2 - Catches of Factory Stern Trawlers

Fishing Ground	1965	1964	1963	1962
Metric Tons (Per Day of Fishing)				
Greenland (Davis Strait)	-	23.8	17.6	27.2
Labrador Coast	29.1	26.0	23.0	28.9
Newfoundland (Grand Banks)	22.6	26.8	27.9	20.2
Nova Scotia (Sable Island)	-	-	11.1	-
Gulf of Maine and Georges Bank	27.6	21.2	-	11.5
Average	25.9	26.0	26.6	21.8

The annual operating costs of a factory stern trawler are 14 times those of a cutter and 3 times those of a large side trawler operating in the North Sea. Notwithstanding these enormous differences in capital and manpower, the operating costs per unit of production are not greatly different.

What It Costs To Land A Fish

During 1963-65, it cost about 6,000 zloty (US\$250.00) to produce 1 metric ton of fish--from nearby Baltic fishing grounds to Polish ports--and only 6,150 zloty (\$256.00) to land 1 ton of fish from the distant Northwest Atlantic (table 3). In other words, 1 kilogram (2.2 pounds) of landed fish cost 25 U. S. cents in the Baltic and 25.6 cents in the Northwest Atlantic. The operational costs in the North Sea were much greater (35.4 U. S. cents per kilogram).

Table 3 - Production Cost of 1 Metric Ton of Landed Fish in the Northwest Atlantic and on Short-Distance Grounds in 1963-1965

Fishing Region	Initial Cost	Operating Costs	Manpower Needed
.. (Polish Zloty/1) ..			
Baltic	15,000	6,000	0.35
North Sea	24,000	8,500	0.45
North-West Atlantic	22,000	6,150	0.20
1/24.00 zloty equals US\$1.00.			

Poland (Contd.):

The "initial"^{1/} production costs, lowest for small, inexpensive fishing cutters fishing in the Baltic, are much higher in the North Sea (\$1,000 per 1 metric ton) and only a little less for factory stern trawlers fishing in the Northwest Atlantic (about \$910 a ton).

Higher initial expenses for trawlers, however, are offset entirely by lower manpower needs. During 1963-65, only 2 manpower units were needed to produce 100 tons of fish in the Northwest Atlantic, 3.5 units in the Baltic, and 4.5 units in the North Sea. So it is twice as expensive in salaries, fishermen's benefits, and insurance to fish in the North Sea as it is in the Northwest Atlantic. These costs reflect the average catch per man: in the Baltic, each Polish fisherman catches 30 metric tons; in the North Sea, 22 tons; and in the Northwest Atlantic, 50 tons. (Note: The period during which these quantities were landed is not given in the original text, but it is believed to be 1 year.)

The data show clearly that the profitability of fishing in areas greatly distant from home ports depends on a consistently high rate of landings. The Poles have achieved this in the Northwest Atlantic and intend to further expand their fishery there. ("Polish Maritime News," Dec. 1966, and other sources.)

^{1/}Possibly means "capital investment."



Denmark

1966 CATCH REACHED 1965 LEVEL

The 1966 Danish fish catch reached the 1965 level of about 800,000 metric tons despite a slow start. Generally, higher prices enhanced the catch value. Exports of fishery products were slightly greater than 1965's record US\$124 million, although quantity was slightly less.

Cod Fillets and Blocks: Danish exports of fresh and frozen fillets and blocks of cod and cod-like fish totaled 48 million pounds in 1966 and 46 million pounds in 1965. Exports to the U. S. increased sharply in 1966.

Prices for cod fillets and blocks weakened considerably during the second half, which could divert supplies to European markets and reduce their exports to the U. S.

Pond Trout: Exports totaled 22 million pounds in 1966 and 23 million pounds in 1965. Shipments to the U. S. accounted for 1.8 million pounds in 1966 and 1.5 million pounds in 1965.

Purse-seine Gear: The industry has taken initial steps to enter the new purse-seine fishery for herring and mackerel. Excellent success with the new gear late in the year points toward increasing participation in those fisheries during 1967. (U. S. Embassy, Copenhagen, Jan. 27, 1967, and other sources.)

GREENLAND AND DENMARK HAVE COD MARKETING PROBLEMS

Declining prices for frozen cod fillets and blocks in the U. S. market continue to trouble the Danish fishing industry. Danish sellers say the price declined about 25 percent over the winter--and they are seeking other markets. For example, Danish exporters recently signed contracts to sell cod fillets to Hungarian and Czechoslovakian markets, although these markets will in no way compensate for U. S. sales.

Danish fishermen find prices in British ports somewhat better than at home and they now seek to land more fish in Britain.

Sweden also is affected by the problem. Her dealers claim that Denmark is exporting cod fillets to Sweden at prices considerably lower than those Swedish fishermen must receive.

Reports also indicate concern about decreasing Faroese exports of frozen cod fillets to the U. S. and of iced fish to Great Britain.

Greenland Industry Suffers Price Decline

During the winter, the Greenland fishing industry experienced a price decline of 6 U. S. cents a pound for frozen cod fillets. The Royal Greenland Trade Department is working on plans for various countermeasures, including a change in the type of product. Since the price of a fully finished product would be more stable, consideration is being given to changing over to production of deep-fried fillets for export. ("Vestkysten," and "Dansk Fiskeritidende," various dates and "Børsen," Feb. 16, 1967.)

Denmark (Contd.):

CONFERENCE CONSIDERS
NEW RED SHRIMP PRODUCTS

The Danish Fisheries Ministry invited leaders of the country's shrimp industry to a symposium in late March to consider rising use of deep-water red shrimp (*Pandalus borealis*). The annual catch in Danish and Greenland waters passed 10,000 metric tons in 1965. Catches are expected to rise further during the coming year, particularly in Greenland. There, important new shrimp grounds have been found at Disko Bay and at several locations on the southern part of the west coast.

The largest part of the catch is now being canned, but vacuum-packed frozen shrimp have recently become important. The variety in shrimp products will increase during the coming months with the appearance on the market of vacuum-packed pasteurized shrimp in both frozen and chilled forms. ("Dansk Fiskeritidende," Feb. 17, 1967.)

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COD ARE SCARCE IN NORTH SEA

The cod fishery in the North Sea normally peaks in January and February, but the catch this year has dropped significantly from recent years. Many Danish fishing captains after cod have given up completely. However, the poor catches have not resulted in higher prices on the West Jutland fish auctions because of the high level of frozen stocks on the world market. Danish cod in overseas markets are meeting hard competition, especially from Canada and Iceland. ("Politiken," Jan. 29, 1967.)



Greenland

LAUNCHES RESEARCH VESSEL

The 200-gross-ton steel research vessel "Adolph Jensen" was launched at Frederikshavn, Denmark, on January 31, 1967. The vessel was built for fishery research in Greenland waters. It will have special equipment, including laboratory space and accommodations for 6 biologists.

The new vessel, which replaces an older, much smaller research cutter of the same name, will permit investigations in the large fishing banks off Greenland's west coast, where the most important fisheries are found. ("Børsen," Jan. 28, 1967.)

* * *

ORDERS STERN TRAWLER FROM NORWAY

The Royal Greenland Trade Department (RGTD) has ordered a stern trawler of 499 gross tons from a shipyard in Florø, Norway. It will be 50 meters (164 feet) long and 9 meters (29.5 feet) wide, carry a crew of 28, and fish in the Atlantic north of 59° N. latitude. Twin engines will produce a total of 2,200 horsepower. Delivery will be made in early 1969.

The RGTD has studied thoroughly the productive potential of a larger trawler in Greenland waters and the capabilities of other-sized vessels for this operation. ("Børsen," Feb. 17, 1967.)



Norway

1966 NORWEGIAN EXPORTS
UP 10% OVER 1965

The value of Norwegian exports of fishery products in 1966 was a record US\$225 million, about 10.5 percent over 1965. In 1966, exports were up for frozen herring and herring fish oil, while exports of frozen fillets, canned fishery products, and fish meal were about the same as in 1965.

Frozen Fillets: Shipments of cod fillets, the leading item in the group, were about the same in both years. In 1966, there was an export gain in haddock and herring fillets that offset a shipment decline in fillets of coalfish and other species.

Canned Fish: Higher exports of canned brisling partly offset a drop in small sild shipments; 1966 was a good brisling season, but there was a shortage of small sild supplies early in the year.

Industrial Products: The increase in herring oil exports reflects the increase in out-

Norway (Contd.):

put of the reduction factories. Fish meal production rose sharply in 1966, although actual shipments of fish meal were about the same as 1965. This resulted in a stock buildup toward the end of 1966, which led to a ban on industrial fishing in November and December. However, sales contracts for stocks on hand had been arranged by late 1966, according to the Norwegian reduction industry. ("Fiskets Gang," Jan. 26 & 27, 1967, and other sources.)

REDUCES EXVESSEL PRICES FOR INDUSTRIAL FISH

Norwegian exvessel prices in 1967 for reduction fish were reduced one-third or more from 1966 prices by the fishermen's marketing organizations and the processors. The new basic prices for the 3 most important species are:

Winter herring (fat content 18 percent)
US\$23 a metric ton.

Capelin (fat content 2.7 percent) US\$10.25
a metric ton.

Mackerel (fat content 18 percent)
US\$27.50 a metric ton.

Prices will be adjusted for fat content differing from the specified basic content. For each percent of fat per metric ton, the adjustment will be \$1.28 for winter herring, \$1.18 for capelin, and \$1.21 for mackerel.

The price cuts were made because of reduced prices on the world market for fish meal and oil. According to press reports, the announcement of the reductions has caused concern in Norwegian fisheries circles. Fishermen representing 400 purse seiners have sent a resolution to the Fishermen's Union asking state subsidies for fish delivered to the reduction plants. (U. S. Embassy, Oslo, Feb. 5, 1967.)



Iceland

BANS TRAWLING WITHIN 12-MILE FISHING LIMIT

Iceland's Fishery Minister said in a newspaper interview on January 25 that the large

Icelandic trawlers will not be allowed to fish within the 12-mile fishery limit.

When Iceland extended its fishery limit to 12 miles, it excluded its own trawlers, although other Icelandic fishing vessels were allowed inside. The large trawlers lost some of their most important fishing banks because they were located inside the new limit.

A committee of the Alting (Iceland's legislature) recently adopted a resolution that would permit large trawlers to fish within the limit, but the resolution has met hard opposition and is expected to be defeated. ("Bör-sen," Jan. 27, 1967, and U. S. Embassy, Reykjavik, Feb. 2, 1967.)



West Germany

"METEOR" SAILS ON ATLANTIC OCEANOGRAPHIC CRUISE

The West German research vessel "Meteor" sailed from Hamburg, February 13, on an oceanographic expedition that is part of a broader UNESCO program. She carried 86 scientists, including specialists from Spain, Portugal, United Kingdom, and West Germany.

The Meteor will conduct 2 major investigations in the Atlantic between the Azores and the Canary Islands during the 6-month cruise. One study concerns the variability in physical and chemical characteristics of the ocean strata and currents. In particular, scientists will examine the effect of dense, high salinity Mediterranean Sea water as it enters the Atlantic.

The second major effort will be to explore the tops of certain underwater mountains, especially the Great Meteor Seamount, which rises from depths of 4,000 meters to within 300 meters of the ocean surface. The specialists will study animal life on this and other seamounts. (Some scientists believe underwater mountains are slowly sinking and that organisms are gradually being conveyed to deeper parts of the ocean.)

The research plan also includes a determination as to whether the sea bottom around the Canary Islands shows evidence of once having been part of the African land mass.

West Germany (Contd.):

Modern underwater TV cameras and drilling machines will be used. ("Vestkysten," Feb. 13, 1967.)



Spain

MAY PROCLAIM 12-MILE FISHING LIMIT

The Spanish Government is considering a law for a 12-mile fishing limit measured generally from the low-water mark along the coastline. However, provisions also are made to draw straight base lines between nautical points less than 24 miles apart. Further, provision is made to negotiate agreements with foreign governments whose fishermen claim traditional fishing rights off Spain.

Under the proposed law, Spain would gradually phase out foreign fishing in the 3-6 mile zone. Traditional foreign fishing in the 6-12 mile zone might be continued, at a level not exceeding the habitual catch, providing reciprocal rights were granted. (U. S. Consul Bilbao, Feb. 11, 1967.)



Italy

CANNED TUNA SALES ARE SLOW

According to the Italian Tuna Packers Association, domestic consumption and exports of canned tuna have declined in recent months. This was attributed to the difficulty of promoting sales in Italy because the rising cost of tuna since late 1966 has increased production costs of packers. The lifting of restrictions on meatless Fridays by the Roman Catholic Church also has contributed to the problem. To overcome depressed sales, the Association will try to hold down raw material costs and promote sales vigorously this year. ("Suisancho Nippo," Feb. 16, 1967.)

ENTERS OFFSHORE TUNA FISHERY

As more Italians accept frozen fish, and the demand for tuna products continues to rise, the industry is disturbed by the need for large imports. Most imported tuna comes from Japanese vessels fishing off west Africa. Now Italy has plunged into deep-

sea tuna fishing with the completion of her first 2 oceanic tuna vessels.

These 860-gross-ton vessels were built in Venice for the Societa Italiana Pesca Atlantica Tonno (SIPAT) and are named "Albacora" and "Albacora Secondo."

Overall length is 66.7 meters (219 feet), moulded breadth 10.6 meters (35 feet), and depth 5.24 meters (17.2 feet). The main power unit is a diesel of 1,300 hp., at 350 r.p.m., which drives directly a single propeller for a top speed of 14.5 knots. Fuel-oil tanks have a 388-ton capacity and freshwater tanks 62 tons. Each vessel can accommodate 24 persons.

The fish hold has a capacity of 750 cubic meters and is refrigerated to a temperature of -25° C. (-13° F.). A tunnel-freezer installation can freeze 15 metric tons of tuna a day. ("Fishing News International," Feb. 1967.)



United Kingdom

DIRECTORY OF FISHING VESSELS AND SUPPLIERS PUBLISHED

The "Fishing News Directory and Equipment Guide, 1967," recently published, is a comprehensive directory of British fishing vessels. It lists names and addresses of owners, equipment suppliers, fishery associations, and Government fishery authorities (administrative and research).

Also listed are vessels and owners for main ports, builders and their facilities, vessels recently completed, under construction, or on order.

The outfitters mentioned include suppliers of marine engines; propulsion, transmission, and steering gear; electronic equipment; and catching and hauling gear. Suppliers of marketing and processing equipment are included.

Associations are divided into those of vessel owners, catchers, fishermen, labor unions, processors, boatbuilders, insurance, and others. Its publisher: Arthur J. Heighway Publications, Ltd., Ludgate House, 110 Fleet Street, London EC4, England. Price £1 10s (US\$4.20) a copy.





Fig. 1 - "Tokei Maru," Japanese factory fishing vessel, processes king crab for food.



Fig. 2 - The deck of this Japanese vessel in the North Pacific is covered with bottom fish. (U. S. Coast Guard photographs)

ASIA

Japan

BECOMES BIG IMPORTER OF FISH

Japan, which thinks of itself as the world's leading fisheries nation, has become a large importer of fish.

In 1959, fish imports totaled only US\$7,700,000, but by 1966 had jumped to \$160 million--and this year are likely to hit \$200 million. The reasons: people are eating more fish and the domestic catch is leveling off.

Japan is the world's largest consumer of fish and consumption is rising steadily because of a rising standard of living. High meat prices also have stimulated fish buying.

Surveys show that farm households now eat as much fish as urban families. Western methods of cooking fish have made it more acceptable to younger people, who have been impressed in school with the need for more animal protein in their diet.

Imports Many Species from Near and Far

Controls on fish imports were lifted in 1961. The result has been a constantly growing inflow of shrimp, sea bream, tuna, herring, salmon roe, and cuttlefish, mostly frozen.

Heavy sellers in the Japanese market include neighbors like South Korea, the Soviet Union, and Taiwan, and more remote fisheries nations like Peru, Mexico, Spain, and Australia. The big Japanese fisheries companies also have become leading importers. Imports have been further stimulated by reciprocal deals, in which Japan sells vessels, equipment, and supplies technical aid in exchange for fish.

Meanwhile, Japan's own fish catches have leveled off sharply. Its total catch in 1965 was 6,880,000 tons--only 20,000 tons more than in 1962. Offshore fishing has declined markedly. ("Asahi," Feb. 3, 1967.)

PER-CAPITA CONSUMPTION OF FISH AND SHELLFISH ROSE IN 1965

Per capita fish and shellfish consumption in Japan in 1965 averaged 76 grams a day (about 2.6 ounces a day or 60.2 pounds a year), according to data of the Japanese Ministry of Agriculture and Forestry. This is a 4.5-percent increase over the 1960-64 average and 11.8-percent over 1964.

Year	Fish and Shellfish Consumption	Increase
	Grams ¹	%
1965	76.0	-
1964	68.0	11.8
1960-64 avg.	72.3	4.5
1955-59 avg.	65.5	15.3

¹/One gram is equal to about 0.035 ounces.

This increase was attributed primarily to the record high fish landings in 1965 of 6.5 million metric tons. Per capita protein consumption in 1965 was 77.6 grams a day--53 grams (68.3 percent) from vegetable sources and 24.6 grams (31.7 percent) of animal protein. Fish constituted 12.6 grams (51.2 percent) of the animal protein. ("Nihon Suisan Shimbun," Feb. 8; "Suisancho Nippo," Feb. 6, 1967.)

WILL PROMOTE DOMESTIC EATING OF CANNED TUNA AND SALMON

The Japan National Canned Food Wholesalers Association plans to promote the sale of canned red salmon and canned lightmeat tuna packed in oil on the domestic market to make up for depressed canned red salmon exports to Great Britain and declining domestic sales of canned soy-sauce-seasoned tuna and saury. The Association will conduct the campaign with the Japan National Federation of Fishermen's Cooperative Associations (NIKKATSUREN). In 1966, NIKKATSUREN launched a drive to promote domestic consumption of canned whitemeat tuna in oil. ("Suisan Tsushin," Feb. 21, 1967, and other sources.)

Japan (Contd.):

FROZEN TUNA EXPORT
PRICES ARE DROPPING

As of early March 1967, good yellowfin catches by California tuna fishermen and the slowdown in canned tuna sales in the U. S. have depressed sales of Japanese frozen tuna to U. S. packers to the lowest level in recent years. The result is a sharp decline in Japanese frozen tuna export prices. The early February price offered by U. S. packers for gilled-and-gutted yellowfin for direct export was US\$430 a short ton c.i.f. Prices for direct albacore exports to the U.S. also are expected to decline below \$500 a ton c.i.f., heretofore maintained.

In the Atlantic, where most of the Japanese tuna fleet continues to concentrate on albacore, export prices are expected to weaken further. Current prices of Atlantic-caught albacore are not known because virtually no new sales to U.S. packers have been made since mid-January. Then, the price was \$440 a ton, f.o.b. Atlantic transshipment port. Prices may have fallen below \$420 a ton.

Japanese Watch Market Changes

In the Indian Ocean, Japanese vessel operators now fishing mainly for yellowfin are greatly concerned about recent market developments, especially dropping California yellowfin prices. The \$320 a ton recently offered by California packers for domestic yellowfin landings is comparable to the Japanese export price of \$410 a ton c.i.f. If the U. S. exvessel price drops to \$300 a ton, the Japanese export price may drop to below \$400 a ton. The Japanese also are concerned over growing tuna operations in the Indian Ocean by Formosa and other countries. They fear this may further disrupt prices.

Another problem facing the tuna industry is Italy's reduced tuna imports from Japan in recent months. Italy had provided a good market to which Japanese Atlantic and Indian Ocean-caught yellowfin could be diverted when U. S. market conditions were unfavorable. ("Suisan Tsushin," Feb. and Mar. 1967.)

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1966 SAURY PRODUCTION
WAS DISAPPOINTING

The 1966 Japanese saury production fell below expectations--landings of 237,800 metric tons worth 9,877,500,000 yen (about US\$27.4 million). This was an increase of 3 percent in quantity and 4 percent in value over 1965, but it failed to attain the 250,000-300,000 metric-ton level predicted for the season. Exvessel prices averaged 41.5 yen a kilogram (US\$104 a short ton). ("Nihon Suisan Shimbum," Feb. 8, 1967.)

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ADOPTS 1967 FROZEN TUNA
TRANSSHIPMENT QUOTAS TO
ITALY AND U. S.

The Japanese Frozen Tuna Producers Association set new frozen tuna export quotas for business year 1967 (April 1967-March 1968). A quota of 44,000 metric tons was set for export to Italy, and 4,000 short tons for Indian Ocean transshipments to the U. S. The Italian quota is 14,000 tons over the duty-free quota of 30,000 metric tons established by the European Economic Community. The Indian Ocean transshipment quota for the U. S. is the same as BY 1966. ("Katsuo-maguro Tsushin," Feb. 17, 1967, and other sources.)

* * *

SET PLANS FOR 1967
NORTH PACIFIC TRAWLING

Tentative 1967 plans for Japanese trawling in the North Pacific were announced in mid-January. The fleets will total 14 with about 210 trawlers. Five fleets will fish all year and every company is planning on greater landings.

The Japanese trawl fisheries in the Bering Sea lost money after 1958--but recently, due to improved operations, they are beginning to make a profit. One feature of this year's plans is the increase in production of minced meat aboard motherships.

The extent of this fleet's operations in waters south of the Gulf of Alaska is not known yet. Apparently, the exploratory fishing last fall was not profitable, but the results are still being studied to see if the operations can be made more efficient.

Japan (Contd.):

For minced meat production, the fishing would focus on Alaska pollock found in the more northern waters of the North Pacific. (Fishery Attaché, U. S. Embassy, Tokyo, Feb. 3, 1967.)

FIRST ATTEMPT TO BUY MEXICAN FROZEN SHRIMP MEETS DIFFICULTY

The Japanese trading firm Mitsui Bussan recently contracted with a Mexican shrimp fishing firm to buy frozen shrimp for direct shipment to Japan. Heretofore, all Mexican shrimp exports to Japan were handled through a U. S. broker and shipped from Los Angeles or San Francisco. Mitsui Bussan could not obtain more than 30 of the 300 metric tons it had planned to buy for the initial shipment to Japan.

The firm faces considerable financial loss because it rented refrigerated space for 300 tons on the freighter scheduled to depart Mazatlan in late February. Despite this setback, the firm intends to continue this venture because, eventually, it may cut costs of shipping Mexican shrimp to Japan by 80 yen a kilogram (US\$0.099 a pound). ("Suisan Keizai Shim-bun," Feb. 27, 1967.)

WILL STUDY TERRITORIAL SEA LIMITS OF OTHER NATIONS

The Japanese Foreign Ministry plans to send Treaty Bureau Chief Fujisaki and Investigator Kawakami to South American, European, and South African countries on a 3-week trip to study the laws, treaties, and views of those nations on territorial sea limits and exclusive fishing zones. The two-man team, scheduled to depart February 22, plans to visit Mexico, Peru, Chile, Brazil, Argentina, Spain, Union of South Africa, and Kenya.

The Foreign Ministry reportedly hopes to use the team's findings to reexamine Japan's position on territorial sea limits and contiguous zones. At present, Japan and a few other nations adhere to the 3-mile concept--despite the growing trend among coastal states toward extending their territorial sea limits and exclusive fishing zones. ("Suisan Tsushin," Feb 21, 1967.)

ARGENTINA'S 200-MILE LIMIT WILL AFFECT JAPANESE FISHING

Argentina's recent decree extending her maritime jurisdiction to 200 nautical miles--and her sovereignty over the adjacent continental shelf up to the 200-meter isobar--is expected to affect Japanese trawl, tuna long-line, and whale fisheries. In particular, Japanese trawl operations aimed at developing the abundant merluza (hake) resource off Argentina will be impaired considerably by this decree.

The Japanese Government is concerned over this development. It is reported to have lodged a strong protest with the Argentine Government claiming it cannot recognize Argentina's unilateral extension of territorial sea limits--and that the extension has no effect internationally. ("Suisan Keizai Shim-bun," Feb. 1, 1967.)

GOVERNMENT ASKED TO PREVENT S. KOREA FROM HIRING JAPANESE FISHERMEN

On January 31, eight organizations concerned with northern seas fisheries asked the Japanese Ministries of Agriculture-Forestry, Foreign, and Transportation to control legally the hiring of Japanese crewmen by Republic of Korea (ROK) fishing vessels. ROK, which is attempting to start salmon fishing operations in the northern seas, is recruiting Japanese instructors at Toyama and Nemuro.

The 8 organizations argued: (1) the ROK action violates the Japan-Soviet Fisheries Agreement and the Japan-U.S.-Canada Fisheries Agreement; (2) ROK fishing for salmon will disturb the fishery order; and (3) considering the condition of resources, the entry of a third power cannot be approved. ("Sankei," Tokyo, Feb. 1, 1967.)

BANS ITS FISHERMEN FROM FOREIGN SALMON VESSELS

On February 13, the Japanese Government partially revised the Fisheries Licensing and Control Ordinance to prohibit its nationals from salmon fishing aboard foreign vessels. The new ordinance, which also sets penalties for violators, will render it impossible for Japanese fishermen to work for the South

Japan (Contd.):

Korean fleet planning high-seas salmon operations in the North Pacific. Earlier, the Government used the Passport Law to curb their travel abroad.

As a result, South Korea's recruitment of Japanese salmon fishermen has virtually ended. However, a problem has arisen concerning cancellation of provisional employment contracts signed earlier by 22 Japanese. Three of the 22 have cancelled their contracts. But the remaining 19 have spent all the advance pay of 30,000-50,000 yen (US\$83-139) received from the South Korean fishing firm and are having trouble returning the money.

The Korean firm reportedly plans to sue the 19 for nonperformance if they fail to pay. Meanwhile, the Seasonal Fishermen's Union in Toyama Prefecture (Japan Sea coast), to which the fishermen belong, is seeking Government help to solve this problem. The union claims the new ordinance infringes on human rights. It is considering a civil suit against the Government if the distressed fishermen are not helped. ("Minato Shimbun," Feb. 16, 1967.)

* * *

STUDY TUNA BASE ON WESTERN SAMOA

The Japanese fishing firms now supplying tuna to American Samoa are considering establishment of a tuna base at Apia, capital of Western Samoa, which became independent in 1962. The firms are Taiyo Gyogyo, Nichiro Gyogyo, and Nippon Reizo. They face growing difficulty in negotiating tuna prices for deliveries to American Samoa because U. S. packers there are relying more heavily on landings by Formosan and South Korean vessels.

The Japanese firms believe that a base at Western Samoa would be more advantageous even if prices for tuna delivered there were 10 percent below American Samoa's because they would not face the problem of tuna rejects. Two possible uses of the bases are being considered--cold-storage and tuna-packing operations. If a tuna base is set up, its primary use will likely be as a cold-storage point for tuna exports to Hawaii and mainland U. S. The Government of Western

Samoa is reported interested. ("Suisan Keizai Shimbun," Feb. 16, 1967.)

* * *

RESEARCHERS SEE POTENTIAL USE FOR FUR SEAL CARCASSES

Researchers at Keio University in Tokyo reported finding amino acids (polypeptides) in fur seal muscle. These acids are said to have a beneficial effect on high blood pressure, and in promoting skin smoothness by dilating surface blood vessels. Their report has caused Japanese firms to be interested in buying seal carcasses from St George Island in the Pribilofs.

* * * *

PRICE AGREEMENT REACHED FOR INDIAN OCEAN TUNA

The Japanese Overseas Fishery Company, which operates the tuna bases at Penang, Malaysia, and Port Louis, Mauritius Island, in the Indian Ocean, reached a price agreement with vessel owners for February landings there. The prices for large albacore and yellowfin represent a 10-yen a kilogram (US\$25 a short ton) decrease from December 1966-January 1967 prices.

February 1967 Tuna Delivery Prices for Penang, Malaysia, and Port Louis, Mauritius Island

Species	Penang		Port Louis	
	Yen/Kg.	US\$/Short Ton	Yen/Kg.	US\$/Short Ton
Albacore, round:				
Lge. (over 24 lbs.)	172	434	152	383
Sml. (under 24 lbs.)	117	295	102	257
Yellowfin, gilled & gutted:				
Lge. (over 117 lbs.)	160	402	145	365
Sml. & med. (23-117 lbs.)	155	391	135	340
Big-eyed, gilled & gutted:				
Over 64 lbs.	105	264	95	239
23-64 lbs.	80	202	70	176
Bluefin, gilled & gutted	75	189	60	151

Tuna fishing in the Indian Ocean is reported slow. Catches average 2-3 metric tons a vessel per fishing day. ("Katsuo-maguro Tsushin," Feb. 8, 1967.)



Republic of Korea

INTERESTED IN NORWEGIAN VESSELS

A 3-man Norwegian delegation recently returned from South Korea after studying the pos-

Republic of Korea (Contd.):

sibilities of selling Norwegian-built trawlers, tuna boats, and marine equipment. Negotiations are continuing and prospects of Norwegian sales in excess of 100 million kroner (US\$14 million) are excellent. ("Fiskaren," Jan. 25, 1967.)



Taiwan

TAIWAN AND SOUTH KOREA PLAN TUNA FLEET EXPANSION IN AMERICAN SAMOA

According to information received by Japanese trading firms, Formosa (Taiwan) and South Korea plan to expand their Samoan-based tuna operations this year. Formosa reportedly plans to add 100 vessels and South Korea 10 to their Samoan fleets. If these plans materialize, Formosa will have by

year's end 168 tuna vessels operating out of Samoa, and South Korea 68 vessels.

Japan's tuna fleet based on that island in late December 1966 numbered 25 vessels. Its landings accounted for only 23.6 percent of Samoan tuna landings. ("Suisan Keizai Shimbun," Feb. 16, 1967.)

EXPORTS ALGAE PRODUCTS TO JAPAN

A factory for processing green algae (chlorella) into edible products has been set up in Taiwan. Using green algae as raw material, the factory produces green algae powder and extracts for export to Japan. It also produces monthly 1.2 million pounds of green algae-soybean "milk" and "milk powder" for local consumption. Food products made from this seaweed are rich in protein and fat. The location or ownership of this plant were not given in "Taiwan Industrial Panorama," Vol. 5, No. 11 and 12, December 1966.



FISH-BREEDING IN JAPAN

It is recognized that few of the world's fishing grounds are able to withstand increased exploitation, and indeed that many are already overfished. It is interesting, therefore, to learn of one reaction of the Japanese, the world's leading fishing nation, to this situation from the following extract from the Japanese "Times."

"OSAKA--Thirteen prefectures along the Inland Sea coast have disclosed a joint fish-breeding project to combat the dearth of fishing resources. The program aims at preventing the decrease of expensive fish such as sea bream, cuttlefish, prawns, octopi, and swellfish due to sewage from coastal industrial areas, according to the announcement. The prefectures participating in the joint project, include Osaka, Hyogo, Hiroshima, Miyazaki, and Kochi. The announcement said fish are to be hatched at nurseries along the Inland Sea coast and be sent to each prefecture, where they are kept in fish reserves for a month before being released into the sea. Two nurseries are expected to be completed in Oita and Okayama prefectures besides the two existing ones in Kagawa and Ehime prefectures. The operation cost of the joint project is estimated at ¥6 million, which will be appropriated by participating prefectural governments." ("Scottish Fisheries Bulletin.")

Note: 363 yens equal US\$1.

SOUTH PACIFIC

Australia

RESTRICTS SHRIMP IMPORTS FROM INDIA

The "Financial Express," Bombay, India, reported on January 25, 1967, that quantities of Indian shrimp were being held up in Australian ports after strict import quality standards were imposed. This was causing heavy losses because the Indian shrimp are suitable only for the Australian market.

Indian shrimp imports to Australia consist mainly of cooked peeled whole shrimp bought mainly by Chinese restaurants. (U. S. Foreign Agriculture Service, Bombay, Jan. 25, 1967.)



New Zealand

PLANS JOINT FISHING VENTURE WITH JAPANESE

The Japanese fishing firm Tokushima Suisan and a New Zealand firm, the East Coast Fisheries Products Company, are planning a joint fishing venture in New Zealand. The proposed company would engage in sea bream

and tuna long-line fishing in the South Pacific. The president of the Japanese firm was scheduled to visit New Zealand in late April to conduct preliminary talks. ("Minato Shim-bun," Feb. 17, 1967.)



Fiji Islands

FISHING INDUSTRY IS GROWING

Since 1963, the Pacific Fishing Company Ltd., predominantly Japanese controlled, has been operating in the Fiji Islands from a freezing and storage base at Levuka on Ovalau Island. The company has concentrated on catching, freezing, and exporting tuna--mainly to Japan and the United States.

Since its establishment, the company has operated under special legislation exempting it from income and export taxes. Legislation also barred any competitive operation in the Colony. The Government of Fiji is reviewing this status because it wants to encourage investment from outside and to diversify industry. (U. S. Consul, Suva, Feb. 3, 1967.)



RARE SPECIES OF WHALE SAVED BY SKINDIVERS

On the New South Wales coast, skindivers drove a mother whale and her calf out of Sydney Harbor--and so may have saved the last of a rare species known as the "Southern Right." The name "Southern Right" originated during the 1800s because this species was considered the "right whale" to catch. Dr. W. H. Dawbin of Sydney University identified the species from underwater photographs taken by the skindivers.

The Southern Right whale was the foundation of the Australian and Antarctic whaling industry in the 1800s and they were slaughtered by the thousands. In the Antarctic, 200,000 were killed by American whalers alone. By 1900, the herds had been decimated, and the Australian whalers had to turn to the sperm whale in eastern states and the humpback in Western Australia. In 1929, the Australian State Governments decided to put the species under total protection because sightings of the Southern Right whale were almost nonexistent. This delayed step to save the species was followed by other governments throughout the world. However, protection did not produce new herds and the species seemed doomed. ("Science News.")

AFRICA

Ghana

JAPANESE RESUME TECHNICAL AID

Japanese training of Ghanaian vessel crews in trawl operations has been resumed after a year of negotiations between Nihon Suisan and the Ghanaian Government Fishery Corporation. Nihon Suisan concluded its first technical cooperation agreement with Ghana in 1964. Recently it agreed to provide 25 Japanese nationals to man the 1,980-ton trawler built in domestic shipyard for Ghana. The vessel was scheduled to depart on February 4, pick up 30 local trainees, and conduct trawling off Angola. Four more 1,900-gross ton Japanese trawlers are reported scheduled for delivery to Ghana. ("Minato Shimibun," Jan. 31, 1967.)



Mauritania

EXTENDS ITS TERRITORIAL WATERS FURTHER

On February 13, the Government of the Islamic Republic of Mauritania (GIRM) extended its territorial waters to 12 nautical miles. It also increased greatly the waters claimed for its jurisdiction in which trawling will be permitted.

The new law, effective in mid-March, abrogates the previous GIRM claim to a modified 12-mile limit: a 6-mile limit of territorial waters, and fisheries jurisdiction in the 6-mile contiguous zone beyond. The territorial waters claimed are further increased by establishing a straight line from Cape Blanc to Cape Timiris as the base from which to calculate territorial jurisdiction. On the southern Mauritanian coast, the base reference point still is the low-tide mark.

Waters Opened to Trawlers

All of Mauritania's territorial waters, except the Bay of Levrier, now are opened to GIRM-authorized trawlers. Previously, the GIRM had permitted trawling only in the 6-mile zone over which it claimed fisheries jurisdiction. Trawling permission now may be granted on a boat-by-boat basis to vessels

of nations that conclude bilateral agreements with GIRM, or to Mauritanian-flag vessels. To qualify for Mauritanian registry, vessels must be manned by at least 50 percent Mauritanian nationals or "assimilees." An "assimilee" is a French national considered "Mauritanian" for purposes of GIRM nationality requirements by a special long-standing protocol between GIRM and France. (U. S. Embassy, Nouakchott, Feb. 21, 1967.)



South Africa

LIVE SPINY LOBSTER TRADE GROWS

A central marketing body has been set up to coordinate the activities of the 6 South African companies holding concessions to sell live spiny lobster in Europe. Eighty percent of the live lobster are sold in Paris and Nice. During the first 5 months of 1966, 139 tons worth about US\$425,000 were exported. The 1966 catch was limited because of adverse fishing conditions.

The export by air freight of 175 short tons of live spiny lobster to Europe in 1965 was a marked increase over the 1964 figure of 17½ tons, according to the Cape Lobster Exporters' Association.

In 1964, 1½ tons of whole fresh frozen lobster were exported; in 1965, 64 tons. Export of tails is worth about \$11,900,000 a year. ("South African Digest," Feb. 10, 1967.)



South-West Africa

PILCHARD QUOTAS REMAIN THE SAME

Pilchard quotas of 90,000 tons for each of the eight factories in Walvis Bay (South-West Africa) remain unchanged for the 1967 season.

At Walvis Bay and Luderitz, during October 1966, output of fish products was:

Fish meal (short tons)	3,524
Fish oil (gallons)	70,112
Canned fish (1,000 lbs.)	

South-West Africa (Contd.):

At Luderitz, during November 1966, production and exports of fish meal and canned spiny lobster were:

	Weight	Value
	Lbs.	US\$
Fish meal	4,256,000	175,500
Canned spiny lobster	9,400	14,800
Total	4,265,400	190,300

The Fish Meal Picture

An interim report by the Oceana Group of fishing companies reveals that the overall return from fish meal sales in 1966 was considerably better than 1965's. In recent weeks, however, international markets have changed rapidly and 1967 returns will be lower. There was heavy production in Peru in second-half 1966; the year also was exceptionally productive for Scandinavia and Iceland.

The report also states that if consumption is to be boosted to a point where the world export surplus can be readily absorbed, prices should remain realistic. If the volume of production in South Africa and South-West Africa can be maintained, world fish meal trends would not be considered disturbing. ("Barclay's Trade Review," Johannesburg, January 1967.)



South Africa Republic

CONDUCTS FISHING TRAINING

A Cadet Course for young men who intend to take up commercial fishing in the inshore fishing industry as a career is being held for the first time at the South African Merchant Navy Academy at Granger Bay, Cape Town.

When they complete the course in November-December 1967, all candidates will be required to take examinations; the successful ones will win a "Diploma Certificate--Fishing Cadet." The Department of Transport will allow certain "sea time service" reductions in favor of such certificate holders so that later they can take examinations for mate and skipper certificates of competency.

Fees are about US\$540 for the full year, including board and lodging. The course started on Jan. 23, 1967.

The fishing cadets will be trained in elementary applied mathematics and physics, theory of navigation, practical and theoretical seamanship, practical navigation, ship construction and stability, and electronic equipment. Also, they will study elements of engineering and refrigeration, radiotelephone procedure, marine biology, history of the fishing industry, and fish preservation. ("Namib Times," Walvis Bay, Dec. 23, 1966.)



Kenya

ISSUES LICENSE REGULATIONS FOR SHELLFISH BUSINESS

The Government of Kenya issued, December 20, 1966, the Fish Protection (Crustacea) Rules 1966, which bring under license the selling, marketing, and processing of crustacea, including all species of shrimp, prawn, lobster, crawfish, and crab.

The intent of the rules is to give the Kenya Inshore Fisheries Limited, formed in June 1966, a trading monopoly in these products. The firm has equity participation from the Government, a British firm, and local businessmen.

In 1965, the exports of fresh crustacea amounted to 15,700 pounds worth about US\$10,000. Those exports will grow considerably during 1967 because the firm has all the facilities to process and export them. (U. S. Embassy, Nairobi, Feb. 3, 1967.)



Zanzibar

STUDENTS COMPLETE FISHERIES TRAINING IN EAST GERMANY

About 20 of the 70 fisheries trainees Zanzibar sent to East Germany in 1965 for training have returned home. They studied ship engineering, ship handling and other aspects of seamanship. They plan to continue their studies and to teach their new skills to other

Zanzibar (Contd.):

students. Only 10 of the 70 were awarded "certificates" for completing the course. Other students, only partially trained, are being returned to Zanzibar to go to work in the fishing industry and continue their studies concurrently.

Two fishing vessels are on the way to Zanzibar. "Teachers" from East Germany are accompanying the students and will carry on their work until the students can do their jobs unassisted. The teachers also will carry out further investigations into the local fishing industry and the canning of fish. (U.S. Consul, Zanzibar, Feb. 21, 1967.)



Spanish Sahara

FRENCH FISH FOR SPINY LOBSTER

The Brittany coast and the Bay of Biscay down to the Spanish border long have been excellent French fishing grounds. But the demand for certain fish sometimes exceeds supply and compels fishermen to travel further.

One very specialized operation is fishing for the Green Mauritanian spiny lobster (*Palinurus regius*). This crustacean differs from the ordinary English variety, known as "Red" lobster in France. It is caught mainly in shallow water off Spanish Sahara, in 12 to 18 ft., along a small stretch of coast called "Rio de Oro," near St. Etienne. Catching and bringing them back alive was first devised by Breton fishermen. Now that it belongs to Spain, Spanish authorities make some attempt to control fishing. Their first move was to restrict fishing to March 1-August 31. Foreign fishermen may be excluded altogether in the near future.

Special Vessels Used

Vessels built in Douarnenez and Camaret were designed to spend up to 6 months at sea, store catches in open holds, and so bring them back alive.

Of 30 small vessels now operating, the 240-ton "Ar Bec" is typical. Built 10 years ago of timber, the hold contains 200 cu. m. of sea water and can take 20 tons of lobster. She is not meant for speed. In heavy weather, she slows down because the pressure of wa-

ter entering and leaving hundreds of slits and holes, when she rises and falls, can damage the fragile cargo. The Danish 240-hp. diesel normally drives her along at 7 knots. Considering her length of 90 ft., 25-ft. beam, and 13-ft. draught, this is reasonably good.

The hold's interior is protected with an inch-thick coating of cement, reinforced by steel rods laid over the Iroko planking. Usually, this lasts up to 10 years before requiring inspection and replacement. On being slipped, straw is burned in the hold to kill various growths and parasites.

The vessel has a working life of 25 years, depending on upkeep. Sometimes, this is complicated by a traditional system of having up to 100 shareholders. Disagreements occur, especially after a poor catch. The crew of 11 men and a boy work on a shareout basis. Usually, 52 percent goes to the vessel; 48 to the crew--the skipper has $2\frac{1}{2}$ shares to any of the crew's one.

How They Fish

The "Mother" ship first is based in a safe anchorage. Then, using two 25-ft. sea-going launches with 18-hp. diesels, the men go out to set their nets. Each man lays 30 at a time. The nylon nets are about $3\frac{1}{2}$ ft. wide. One side is kept on the bottom by lead weights; the other is kept upright by a string of small floats.

Because this is done near rocks, there is much damage to nets. Every morning, each man picks up his 30 nets and lays down another 30. Then, he returns to vessel, untangles spiny lobsters, each weighing $\frac{3}{4}$ to $1\frac{1}{2}$ pounds, and repairs damage for next morning's work. About 140 nets are allocated to each man per voyage. The hold, subdivided into 5 sections, is inspected by using an "Aqualung" to remove any dead lobster.

Back in port, a large nylon tarpaulin is laid under and around the hull, while large capacity pumps remove the water so the lobsters can be unloaded.

Conditions on board are good. Hours are, as the captain aptly put it, "100 percent." Average earnings are about £1,200 (US\$3,400) a year, with a month off after each voyage. But it's a life of swiftly changing fortunes. The cargo has to be sold on arrival because the chances of fatalities, which cannot be sold, increase for every day in port. A 25 percent drop in price is not unusual from one day to the next. ("Fishing News International," Feb. 1967.)



ARTICLES

THE SUN-DRIED-SHRIMP INDUSTRY OF MEXICO'S NORTH CENTRAL GULF

By Travis D. Love*

Sun-dried salted shrimp are little known to the U.S.A. outside New Orleans and Cameron, La. Much of the production is exported to the Orient. In 1965, production in the Louisiana area was 275,000 pounds; 407,000 pounds were imported from Nicaragua and other Central American countries, presumably for reexport to the Orient. Thus, sun-dried salted shrimp are a sizable segment of shrimp products produced in the Americas.

Chinese immigrants started the industry around 1880. Two large expansions occurred--one in 1908, resulting from better marketing; another in the 1920s, when the otter trawl and gasoline-powered craft were introduced. Processing equipment and methods are simple but effective. BCF statistics show that industry production rose to 4 million pounds in 1935. Production declined in recent years because of increased canning and freezing operations.

The Pascagoula Technology Laboratory of the BCF was asked for information on a production process for sun-dried shrimp that might be useful in the A.I.D. assistance program for underdeveloped countries.

HISTORICAL

The sun-dried-shrimp industry began in Louisiana just after the Civil War.^{1/} In 1880, land patents were given to Chinese immigrants living on several islands in Barataria Bay. The Chinese reportedly lived on these islands prior to 1880 and sun dried shrimp. On January 13, 1885, the U. S. Patent Office issued Patent Number 310-811 to Yee Foo for a process to sun dry shrimp. Actually, the Chinese have used this method for preserving shrimp and other animal foods for centuries.

*Laboratory Director, BCF Technological Laboratory, Pascagoula, Miss.

^{1/}Part of this section was obtained from an article in the "Houma Courier" of Houma, La., August 12, 1966, which credited Emile LaPeyere and Leopold Blum.

Bob Collins Sr., one of the oldest living fishermen on Grand Isle, states that the earliest drying platforms were at Manila Village, Bassa Bassa, and Bayou Brouilleau. Later, Filipinos arrived and assisted the Chinese in catching and drying shrimp. The first man to dry shrimp on a large scale was Ting-Ting. The Fisher family of Lafitte was one of the first native producers. Their platforms in Terrebonne Parish were operated by Chinese managers.

Industry Spurred After 1906

Until 1906, sun-dried shrimp had either been exported to the Orient or consumed locally. There were no other means of preserving shrimp in those remote areas. In 1906, a grocery dealer, Leopold Blum, bartered for and distributed dried shrimp. He formed a partnership with Shelley Bergereon to trade in dried shrimp, raw furs, and farm produce. Several other local firms were formed. During the next 20 years, there was a tremendous increase in the production of dried shrimp.

In the early 1920s, beach seines for catching shrimp gave way to the otter trawl. Used auto motors provided a cheap source of power for the small shallow-draft craft. In 1922, Fred Chauvin and Shelley Bergereon were awarded a patent for a rotating-drum shell remover for dried shrimp. Another large production increase followed until, in 1935, the peak of 4 million pounds was reached. Since a 210-pound barrel of raw shrimp yields only 26 to 30 pounds of dried shrimp (13-14 percent), this peak production represented about 30 million pounds of raw whole shrimp.

During the early 1930s, the canning plants and fresh iced-shrimp trade began taking

more of the more desirable larger shrimp. So the dried-shrimp industry began to use smaller shrimp and seabobs, both difficult to peel by hand while raw. In 1948, the Peeler's machine was invented--which could easily peel very small shrimp for canning, and the price of small shrimp and seabobs increased tremendously. The introduction of chemicals to control "blackening" in canned seabobs increased the price of seabobs.

Leopold Blum, still active, reports that his firm handled about 250,000 pounds of dried shrimp in 1965, and that the heavy use of small shrimp for canning and breeding has forced up the wholesale price of dried shrimp to \$2.50 per pound. There are 15 to 20 drying platforms operating intermittently. About 300 small butterfly-net skiffs deliver small shrimp and seabobs to these drying platforms when the price is lower. At times, these small skiffs catch larger shrimp and deliver them to other markets at a higher price.

BOATS AND GEAR

Shrimp for sun drying were caught by hand-pulled beach seines and casting nets until the early 1930s. At this time, the otter trawls and the gasoline-powered craft (fig. 1) made possible a great increase in the shrimp catch per fisherman. As boats increased in power, they ranged farther into the Gulf for shrimp (fig. 2). Some present-day Florida-type trawlers have diesel motors up to 300 hp. and pull two large trawls (fig. 3).

The "butterfly" net was invented to meet the present-day necessity for smaller and



Fig. 1 - Lafitte skiff and otter trawl.

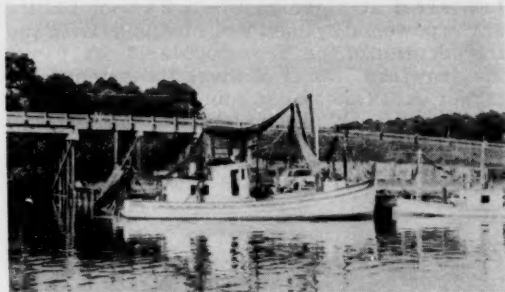


Fig. 2 - Single-rigged Biloxi-type trawler.



Fig. 3 - Double-rigged Florida-type trawler.

cheaper shrimp in the sun-drying industry. It is square, about 10 by 12 feet, made of iron pipe fitted to a small-mesh bag about 15 feet long. Wing nets extend the width as needed to trawl from shore-to-shore in small bayous. These butterfly nets (fig. 4) are

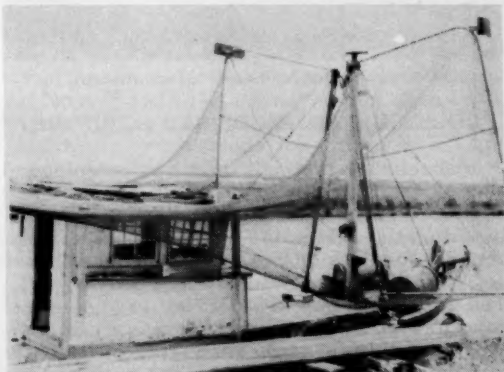


Fig. 4 - Lafitte skiff and butterfly nets.

trawled at night by 18- to 25-foot Lafitte skiffs powered by used V-8 engines. With the introduction of the large double-rigged Florida trawlers, many of these fishermen built larger skiffs and pulled double-rigged butterfly nets (fig. 5). These butterfly nets are so efficient that they are replacing otter trawls on the smaller Biloxi-type trawler in this area (fig. 6).



Fig. 5 - Lafitte skiff and double-rigged butterfly nets.

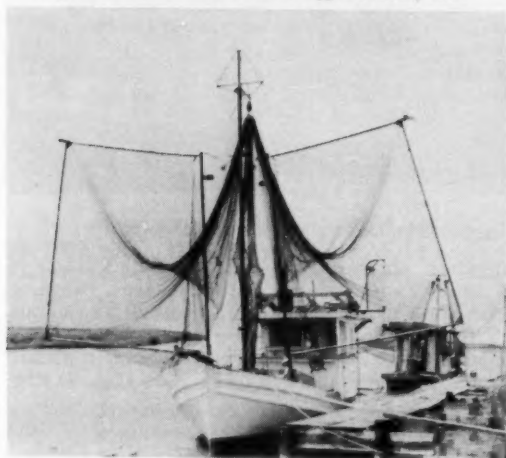


Fig. 6 - Biloxi-type trawler and butterfly nets.

PROCESSING METHODS AND EQUIPMENT

Processing methods and equipment have changed very little since the inception of shrimp drying. Whole raw shrimp are cooked in saturated salt water for 30 minutes. The cooker consists of a steel-mesh hinged basket, which lowers into a steel tank (fig. 7). The cooked shrimp are carried in wheelbarrows to a crude wooden platform and distributed in a thin layer on its surface (fig. 8); 2 to 3 days of hot dry weather are required to

sundry the shrimp. Properly dried and handled, they have a shelf life of up to 1 year. It is necessary to sweep the shrimp into piles and cover them with tarpaulins at night as a protection from the heavy coastal dew-fall (fig. 9). The shrimp, while drying, must be protected in the same manner from rainfall,

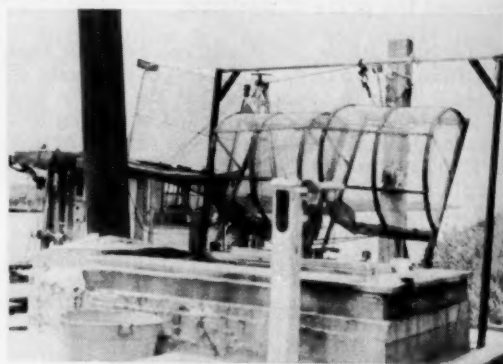


Fig. 7 - Cooking tank and basket.



Fig. 8 - Wooden drying platform.



Fig. 9 - Wooden drying platform with covering tarpaulin.

After the shrimp are properly dried, the shells must be removed. For small amounts, the shrimp may be flailed with a bundle of branches or a large homemade "flyswatter". The loose hulls are removed by sifting or winnowing. These methods consist of either shaking the shrimp on hardware cloth or pouring them from a height during a brisk wind. A mechanical shell remover has been patented. It consists of a 4 by 10 foot cylindrical drum of hardware cloth rotated by a motor. Angle-iron flanges inside the drum

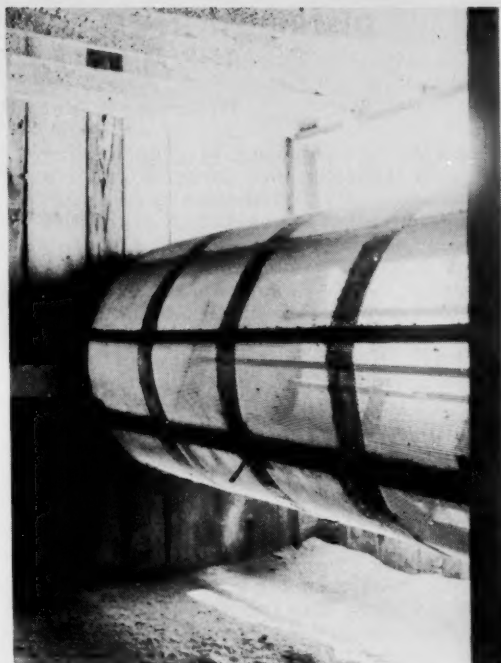
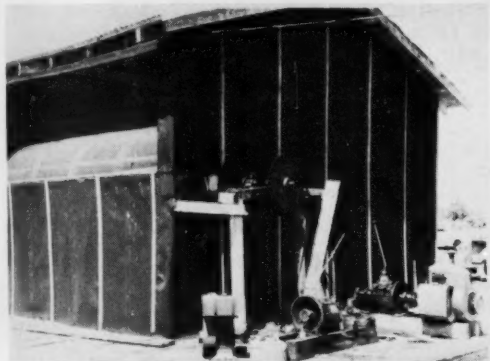


Fig. 10a and b - Mechanical shell remover.

toss the shrimp and cause their hulls to break off (fig. 10). A small amount of shell retained with the shrimp is acceptable in the industry.

Some sun-dried salted shrimp is hand cleaned of shell for use as hors d'oeuvres. Usually, it is packaged in small polyethylene bags and distributed to bars and taverns.

CHEMICAL COMPOSITION

A 210-pound barrel of small shrimp will yield 26 to 30 pounds of sun-dried salt shrimp. Recipes developed by the firm of Bergereon and Blum of Houma, Louisiana, require the reconstitution of the dried product in warm water prior to use in a shrimp dish. Considerable loss of protein is known to occur in small shrimp from cooking and from loss of drip prior to cooking. The composition values (table) reported are given for the

Proximate Composition of Dried Shrimp (Average of 2 Analyses)

Lot	Protein ^{1/}	Oil	Ash	Moisture
	(Percent)			
1	65.1	3.7	19.5	9.7
2	55.8	2.7	19.5	9.7
3	66.9	2.0	19.5	10.0

^{1/}Extreme variations in protein may be due to presence of varying amounts of chitin from shell left on the shrimp.

commercial-dried product as taken from burlap bags in the warehouse. 100-gram portions were taken as samples from three lots in the warehouse; composition values are from duplicate analyses on each lot. Protein values are estimated from micro-Kjeldahl determinations for nitrogen X 6.25 (Association of Official Agricultural Chemists, 1965, "Official Methods of Analysis," 10th edition, Sec. 38.011; oil was determined as in Sec. 18.012; ash as in Sec. 29.012; and moisture as in Sec. 22.008).



DISTRIBUTION OF SOUTHERN QUAHOGS OFF THE MIDDLE ATLANTIC COAST

By Arthur S. Merrill and John W. Ropes*

The southern quahog, Mercenaria campechiensis (Gmelin), is a large, common bivalve whose major distribution is confined to the southern half of the east coast of the United States and the Gulf of Mexico. Little is known about its distribution north of Cape Hatteras, N. C. Johnson (1934) listed the range to Virginia; Abbott (1954) defined the northern limit more explicitly as "Chesapeake Bay." Recent findings allow us to show the distribution of the species in the middle Atlantic waters, and to extend the range northward to Point Pleasant, N. J.

The hydraulic dredge, developed and used by the industry to catch surf clams living within the substrate (Merrill and Webster, 1964) proves to be an excellent collector of southern quahogs, which also live within the substrate. Thus, during surf clam research cruises, we were able to record the occurrence of southern quahogs and other species taken by the dredge.

3 Vessels Made 4 Cruises

During 1965 and 1966, the BCF research vessels "Undaunted," "Delaware," and "Albatross IV" made 4 major surf clam cruises in offshore waters from Long Island, N. Y., to Cape Hatteras, in depths to 60 meters. The dredge travelled over about 1,000 square feet of bottom during each 5-minute tow. The southern quahog was taken at 42 of 1,279 stations. In addition, 2 collections were made by staff members while on 1-day trips aboard commercial surf clam vessels. Figure shows the locations where quahogs were caught and lists pertinent data.

We are not aware of any published information on the distribution of southern quahogs in offshore waters of the middle Atlantic bight. In fact, we find no record of the species in offshore waters north of Chesapeake Bay.

We are confident of our identification of the specimens as southern quahogs. Our clams

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have the dominant shell characters attributed to M. campechiensis. The shell is ponderous, inflated, and has a rounded lunule; the surface structure has the dense, concentric lamellations characteristic of the species; and the internal surface is white, lacking a purple border. Collections from several of our stations have been deposited in the Mollusk Department of the Philadelphia Academy of Natural Sciences.

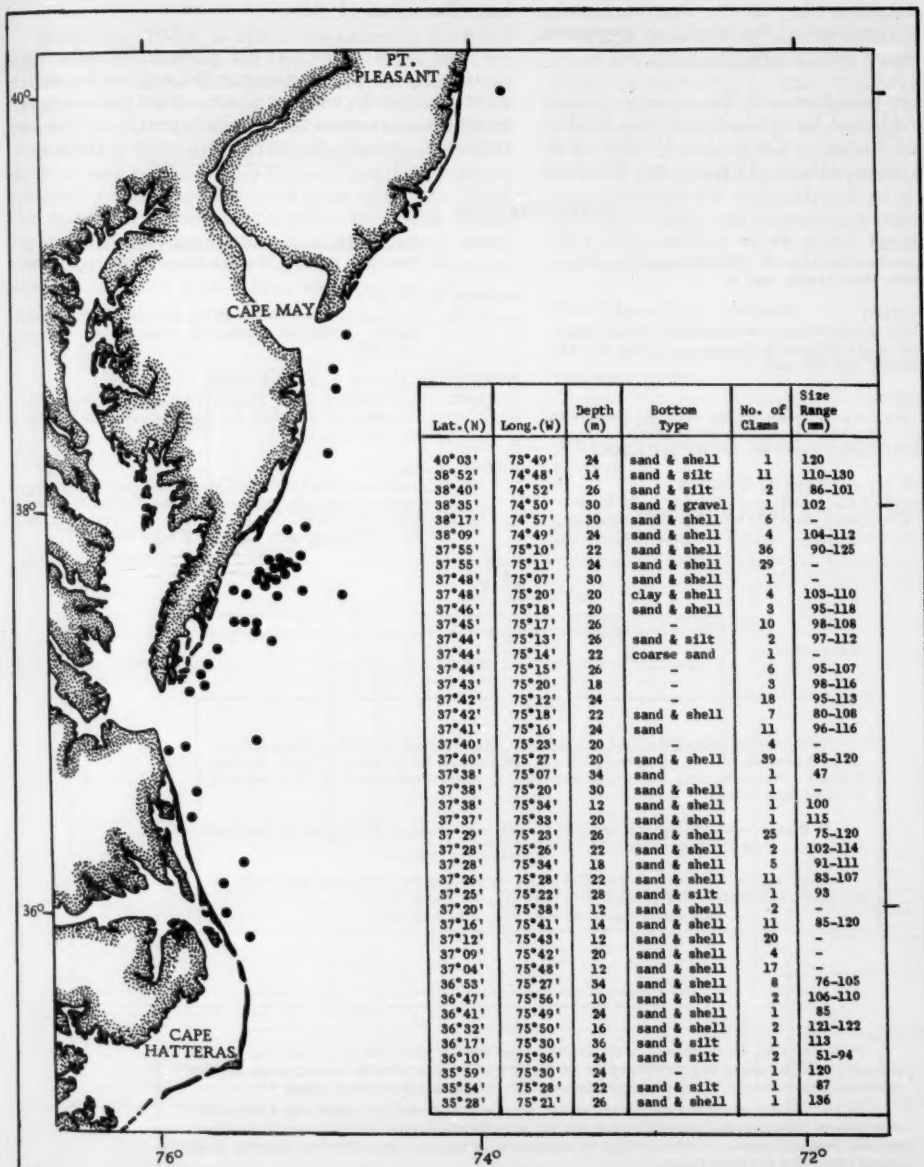
Most of Southern Quahogs Were Large

Most of the southern quahogs collected were large--principally because the hydraulic dredge is selective. The dredge is rigged to retain commercial-size surf clams and to allow small specimens and other material to pass through the mesh linkage. The shell length of the 1 to 39 quahogs caught per tow ranged from 47 to 136 mm. (average 102 mm.). They were taken in water depths of 10 to 36 m. (average 23 m.). The bottom type was usually sand and shell, but at seven stations silt or clay was plentiful along with the sand.

Quahogs were larger and more numerous in sand and shell substrates (average shell length, 105 mm.; average catch per tow, 9.2) than in sand and silt (97 mm.; 2.8 per tow). Pratt (1953) observed faster growth in northern quahogs (Mercenaria mercenaria) living in sandy substrates than in sand and mud mixtures.

Southern quahogs were taken from Point Pleasant, N. J., southward to Oregon Point, N. C. (fig.) and were most numerous in offshore waters southeast of Chincoteague Inlet, Va. Our most northern record for M. campechiensis is off Point Pleasant, N. J., at 40°03' north latitude. A single specimen, 120 mm. long, was taken by a commercial surf clam vessel. The rarity of the southern quahog at this northern locality is indicated by the capture of the single specimen during a 6½-hour period of fishing (34 tows) in which 240 bushels of surf clams were boarded.

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Hard-clam occurrence off the middle Atlantic coast. Dots indicate where clams were taken. Table insert lists station information.

Fossil records indicate that the southern quahog once may have lived much farther north. Morse (1920), who reported on fossil shells in the boulder clay of the Boston Basin, found thick fragments in the various deposits he believed were M. campechiensis.

Our findings complement the recent report on the distribution of hard clams off the southeastern United States by Cummins (1966). The results from exploratory dredging provide

records from Florida to North Carolina. A small fishery for southern quahogs in offshore North Carolina was reported earlier by Porter and Chestnut (1962).

The concentrated population of clams southeast of Chincoteague Inlet may be sufficient to support exploitation. Further assessment seems necessary to determine if the bed is dense enough to warrant a small fishery.

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ERRATA

In the March 1967 CFR--"An Aircraft and Vessel Survey of Surface Tuna Schools in the Lesser Antilles," by Albert C. Jones and Paul N. Sund--page 43, col. 2, line 9 reads: "Skipjack tuna were most abundant in schools estimated at 15 to several hundred tons each."

It should read: "Skipjack tuna, in schools estimated at 15 to several hundred tons each, were most abundant."

Page 44, col. 2, lines 42-48: The ratios comparing the searching efficiency of the plane and vessel were printed 2:2, 2:4, 2:4, 9:6, and 1:1.
The ratios are: 2.2, 2.4, 2.4, 9.6, and 1.1.

Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.



A CLAM MEASURING BOARD

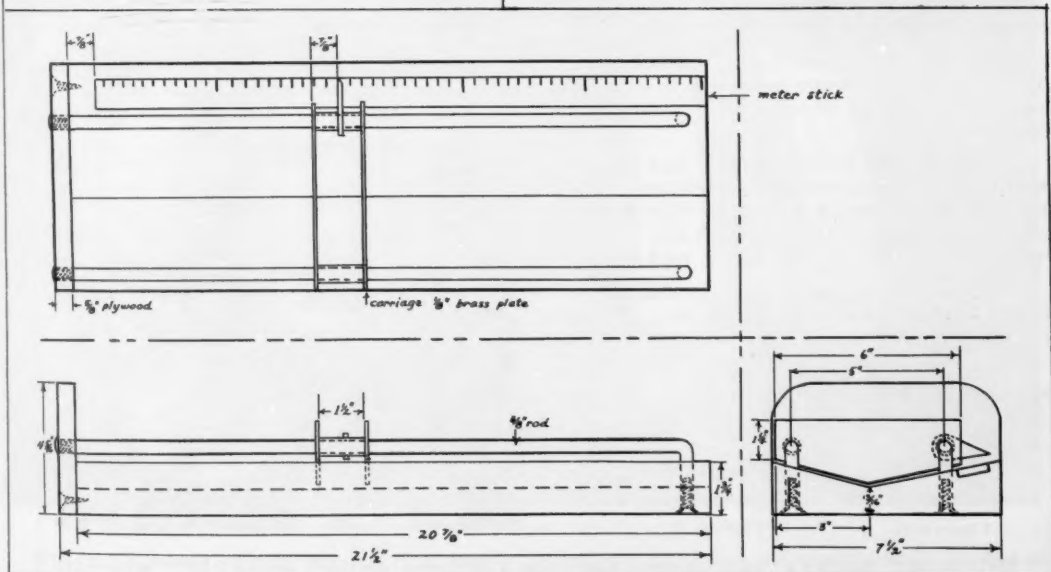
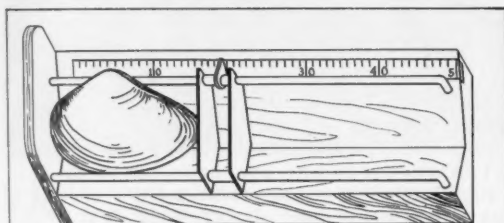
By Phillip S. Parker*

In spring 1964, a clam measuring board (fig.) was developed at the BCF Exploratory Fishing and Gear Research Base, Gloucester, Mass. A different type of board was needed to make rapid and accurate measurements of surf clams (*Spisula solidissima*) aboard vessels at sea because the boards available were generally unsuited for this type of work. With the new board, we were able to make clam measurements rapidly and accurately even under rough sea conditions. Considerable savings in time and effort were effected.

This measuring board can be built by almost anyone handy with tools (see List of Materials and fig.). The entire board (excluding metal parts) is covered with polyester resin to reduce wear and wood deterioration from the action of sand and salt water during use. A light application of grease on the rails is necessary for smooth action of the carriage; the only other maintenance required is to replace the meter stick after the markings become unreadable.

The Materials Needed

1. One piece of $\frac{5}{8}$ " plywood, $4\frac{5}{16}$ " x $7\frac{1}{2}$ ", for the end plate.
2. One piece of 2"x8"x21" clear white pine beveled for the bed of the measuring board.
3. One meter stick recessed and secured by small finish nails into the top of the board,



Sketch of measuring board used during surf clam surveys aboard the BCF research vessel "Delaware".

*Fishery Biologist, Exploratory Fishing and Gear Research Base, BCF, Gloucester, Mass.
Note: This is Equipment Note No. 20.

and offset from the end plate, so the pointer is at zero when the carriage is against the end plate. (Note: the pointer should not scrape the surface of the meter stick.)

4. Two stainless-steel rods, $\frac{3}{8}$ " x 24", for carriage rails.

5. One small flat piece of brass plate, $\frac{1}{8}$ " x 1" x 2", for pointer, which is brazed to a carriage bushing.

6. Two brass plates, $\frac{1}{8}$ " x 2" x 6", plus two $\frac{1}{2}$ " outside diameter $1\frac{1}{2}$ " brass bushings for the

sliding carriage. The plates are brazed to the bushings. The carriage is slid along the rails and the pointer indicates the measurement of the clam on the board.

7. Two $\frac{3}{16}$ " x $\frac{3}{4}$ " flat head bolts and two $\frac{3}{16}$ " x $\frac{3}{4}$ " round head bolts for securing the rails to the bed and end plate.

8. Two $\frac{3}{16}$ " x $1\frac{1}{2}$ " flat head screws for attaching and securing end plate to bed of measuring board.



OYSTERS STILL A FAVORITE DISH

Oysters were a favorite dish of early American settlers who are reported to have learned about the delicacy by watching Indians eating roasted oysters. Oysters are still a favorite dish of many persons in the United States, says the Department of the Interior's BCF.

Oysters are found along this country's coastlines from Massachusetts to Texas and from Washington to Mexico.

The idea that oysters should be eaten only in months containing the letter "R" is simply not true. Actually these succulent mollusks are at their best in May and June on the Atlantic Coast, even though some states prohibit their harvest from public grounds during spring and summer.

"They should be included in meal planning because of their flavor and nutritional value," said H. E. Crowther, acting director of the Bureau. He emphasized that oysters are an excellent source of protein, minerals, and vitamins.

Oysters can be served raw on the half shell or in stews or chowders. They may be baked, broiled, fried, creamed, or scalloped.

The following oyster stew recipe has been developed by BCF home economists.

OYSTER STEW

1 pint oysters	$\frac{1}{2}$ teaspoons salt
4 tablespoons butter	$\frac{1}{8}$ teaspoon pepper
1 quart milk	Paprika

Melt butter, add drained oysters and cook 3 minutes or until edges curl. Add milk, salt, and pepper, and bring almost to boiling point. Serve at once. Garnish with paprika. Serves 6.

Further suggestions on the selection and preparation of oysters can be obtained by writing for the recipe booklet, "How to Cook Oysters." It is available for 20 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.



SLEEVE FOR CLAM JETTING HOSE CONNECTION

By Phillip S. Parker*

This is the second in a series of gear notes describing specific units or pieces of gear used by the BCF Exploratory Fishing and Gear Research Base, Gloucester, Mass., during exploratory sea clam surveys along the Middle Atlantic seacoast. The piece of gear described is a steel sleeve (fig. 1) similar to those used throughout the commercial sea clam industry to connect two sections of clam jetting hose.

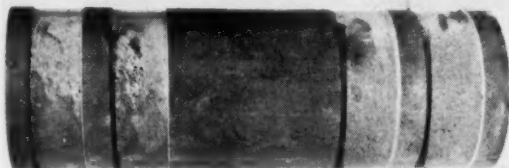


Fig. 1 - Eighteen-inch steel sleeve used for connecting clam jetting hose aboard the Delaware.

2 inches wide and $\frac{1}{16}$ inch deep cut into the steel tubing with 1-inch spacings. The sleeve is 18 inches by 6-inch outside diameter, which allows it to slip easily into the 6-inch inside diameter end of the clam jetting hose. The hose is compressed into the depressions by clamps placed on the outside of the hose over these cuts (fig. 2). The main advantages of this arrangement of hose connection are that the union is more secure, and lengths of hose can be added or taken off with comparative ease in less time than disconnecting the beveled sleeves. With beveled sleeves, the jetting hose is compressed with steel bands, which generally have to be discarded.

To further strengthen the holding capacity of the clamps, a short section of chain is connected between the two inside clamps to keep them from pulling apart. With this arrange-



Fig. 2 - Clamp arrangement over two sections of clam jetting hose.

Whereas sleeves used by commercial fishermen are beveled from the center to each end, the sleeve used aboard the M/V "Delaware" for sea clamming has four depressions

ment, we have had no trouble with the hoses parting at the union even at pressures of above 175 pounds per square inch.

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Note: This is Equipment Note No. 21.

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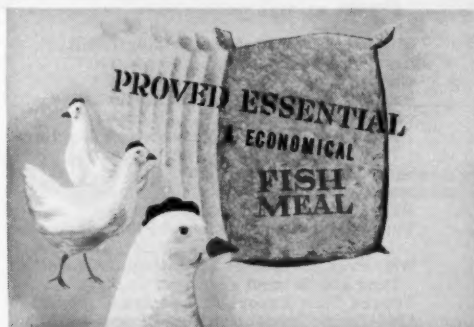
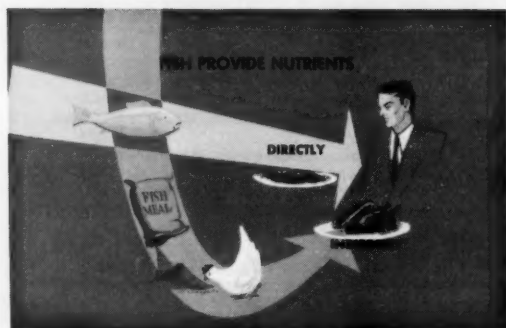
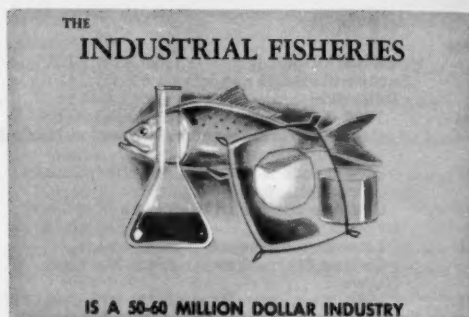
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ADAPTABILITY TO DIETS

	TRACE MINERALS	HIGH VITAMINS	LOW CHOLEST- HYDRATE	LOW SODIUM	LOW FAT	HIGH PROTEIN	HIGH SWEET	EARLY DIETETICS
HADDOCK	✓	✓	✓	✓	✓	✓		✓
OC. PERCH	✓	✓	✓	✓	✓	✓		✓
SALMON	✓	✓	✓			✓	✓	✓
MULLET	✓	✓	✓	✓	✓	✓		✓
HALIBUT	✓	✓	✓	✓	✓	✓		✓
TUNA	✓	✓	✓	✓		✓	✓	✓
SHRIMP	✓	✓	✓	✓	✓	✓		✓
OYSTERS	✓	✓		✓				✓





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